BIENNIAL REPORT

OF THE

Inspector of Coal Mines

OF THE

STATE OF MONTANA

FOR THE YEARS 1911-1912

JOSEPH B. McDERMOTT, Inspector

"INDEPENDENT PUBLISHING COMPANY, HELENA, MONTANA."

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December 28th, 1912.

Honorable Edwin L. Norris,
Governor of Montana,
Helena, Montana.

Dear Sir:

In accordance with the provisions of the Montana Statutes, I herewith submit to you report of this Department covering the years or periods from October 31st, 1910, to October 31st, 1912.

Respectfully Submitted,
J. B. McDERMOTT,
State Coal Mine Inspector.

Report of the Coal Mine Inspector.

The importance of the coal mining industry for commercial, industrial, and social welfare of our country is not generally recognized by the people, while other sources of power are making rapid strides. Electric power generated by waterfalls is, in our own state, being utilized to run undercutting machines to prepare our coal for market, also carried across the state to run compressors and the compressed air used to replace steam hoists. Gasoline motors are used in the coal mines to haul the coal from the working face to the bottom of the shaft. All of this would seem at first glance to give us warning that in time, and short at that, coal using would greatly diminish or disappear; power lines have, in Montana, been reaching out from the Madison River and Missourt River to points remote from its original source, that would be surprising indeed to even most of our own population; but nevertheless coal is useful, plentiful, and the demand for same is increasing within our own borders. This year witnesses the largest yield from our coal mines in our history, and we are not supplying our own demands from the product of Montana Coal Mines. Those of our coal mine operators who have in some measure anticipated the wants and demands of the public and developed their mines, are in a position today to fill large orders and are getting the lion's share of the trade; if the smaller operators would push development and keep it in advance of production, especially during the warmer months when there is less demand for the coal, the production would be greater, and more men would be employed during the rush season. The mines outside of the state would not be able to enter and compete for local or home trade. Instead, we are asked to reward incompetency and neglect by advanced prices, just as soon as the home commercial mines are favored with orders and when the limited output is reached, the prices advance and the outside world is permitted and encouraged to enter our fields. This might not be so bad for the small operator, but he does not get the trade and the

markets fluctuate and before any great period of rush orders with advanced prices is on it's like Finnegan—it's off again.

Many changes have taken place in and around our coal mines within the last two years, some properties declining and others opening up new mines or seams. The Montana Coal & Iron Co. at Bearcreek have sunk a slope to their No. 3 vein and the coal will be handled over the same tipple as in use at present.

The Bearcreek Coal Co., Bearcreek, have opened up No. 3 seam across the gulch from present workings and built a trestle across the coulee, installed electric hoist to handle the loads and empties to and from the tipple; their No. 2 mine has been abandoned. Final pillar drawing is being done in No. 3 mine.

The International Coal Co. have abandoned the gravity plane formerly in use to bring the coal from their No. 3 mine to the tipple and installed electric hoist, also hoist on the inside of the mine to handle loaded cars down the incline and pull empty cars up the hill, which is a decided improvement for the mine.

Bridger Coal & Improvement Co. mine at Bridger has been closed down indefinitely. This is one of the old landmarks and the only long wall proposition we had in the state.

Chestnut mine, property of the N. W. I. Co., the oldest producer in the state is a thing of the past; track, pumps, material, all pulled out, and it is reported the washery will also be torn down and removed shortly.

Electric and Aldridge that were once a bunch of busy little hills giving employment to many hands, are quiet at this time, not operating. These were the principal coke producers in our state and the closing of those mines leaves Montana without a coke producer in operation.

The Pine Creek Coal Co. succeeded the Keene Coal Co. in what is now Musselshell County and a railroad switch, and small tipple have been built, a hoist has been installed and other improvements have been put in and more contemplated to improve the property.

In our last published report The No. 6 Mine of the Cottonwood Coal Co. was reported as opening up. We have now to add No. 7 Mine of the same company, producing coal, adjoining the Brown Coal Co., another coal producer that has been opened up something like a mine and connected with Jim Hill's R. R. by a spur.

Lochray Coal Co., have changed hands and management and have made another opening on the opposite side of the coulee from No. 1 opening. Coal from both mines is handled over one tipple.

Sand Coulee Coal Co. have opened up a mine just outside of the town and have had a spur put in and are loading and shipping coal.

Nelson-Jenks Coal Co. have changed hands, Mr. C. O. Jenks retiring from the firm to devote his time exclusively to railroad management of part of the Gt. N. R. R. system.

Louis Dahn Coal Co., a pioneer in the coal business in Sand Coulee has closed down its mine for the time being.

Oregon & Montana Coal Co., Sand Coulee, has changed hands twice since our last report; the Day Brothers and R. W. Wilson have charge of the property at present and have put in some improvements, namely, boiler, compressor, and undercutting mining machines, compressed air.

Carbon Coal Co., have installed rope haulage from the Gerber tipple into their mine and are developing and producing considerable coal for the commercial market. Since our last report Mr. Ed. Gerber's mine has been finished, having drawn out the material and abandoned the mine and leased equipment to Carbon Coal Co.

Williamson Brothers sold out their mine in Belt to Harner & Son who are producing coal therefrom.

Milliard & Crane Coal Co. have leased or sold their mine to Williamson Brothers.

The Havre Electric Light Co. have leased coal lands from the state, north of Havre and sunk a slope, built tipple, installed hoist, and produced coal for their own use at light and heating plant, also for commercial market during the year.

Mr. John Horsky, Jr., Helena, Montana, has opened up what promises to be a good producing property and the only one on the line of the new Billings & Northern R. R. near Painted Robe station in Musselshell County.

And, with rumors of new lines of railroads and branch lines of other roads in our state being pushed through this coming year, other inviting coal properties will no doubt be opened up.

There are several smaller propositions that we have heard of opening up coal seams, but without having visited them and no reliable data concerning them having been given, we can not

give fuller description. Most of these properties are small country banks, that operate only during the winter months, for fuel for ranches and in summer season closed down.

Coal Cutting Equipment.

The following is list of equipment used in undercutting coal in the coal mines in Montana:

12 Ingersoll Puncher machines—Compressed air power.
26 Harrison Puncher machines—Compressed air power.
1 Sullivan Puncher machine—Compressed air power.
3 Sullivan Post Puncher machines—Compressed air power.
7 Sullivan Electric short wall machines.
11 Jeffrey Electric short wall machines.
11 Goodman Electric short wall machines.

There were less mining machines used in 1912 than in 1911, although some mines are equipping this period that did not have them last period; the less number is accounted for by the decline of one of our larger coal mines in Cascade County, they having reported 14 machines in use in 1911 and only 7 in 1912.

Motors for Hauling Coal in Coal Mines.

The following number of motors in use in our coal mines in 1912 reported:

1 Whitcomb Gasoline motor.
4 Goodman Electric motors.
2 Jeffrey Electric motors.
1 Link-Belt Electric motor.
17 General Electric motors.
Total, 24 Electric and 1 Gasoline motor.

Rope-Haulage.

The following are location of mines using rope-haulage:

2 mine in Sand Coulee.
2 mines in Stockett.
1 mine in Belt.
Total 5 mines all in Cascade County.

Gasoline Motor for Mine Haulage.

Some time ago, the General Superintendent of one of our Coal Companies, wrote this Department that they were taking up the question of purchasing underground gasoline motors, for use in hauling coal to the bottom of one of their mines.

Knowing very little of the uses of gasoline power for mine work, I was very much alarmed; for, I could not see that the

safety factor in our coal mines, would be increased by the installation of gasoline motors.

The objections raised by me were:

The danger of filling motor tanks with naked light on the cap, lighted cigarette or pipe in the mouth, etc.

Danger of storing, for convenience, gasoline in the mine for immediate use.

Danger of wrecking of trip especially motor, wrecking and damaging tank and allowing gasoline to escape and cause damage and trouble in the mine, also exhaust from the motor if used on the intake current would cause danger to the men working in the inside where current was feeble, etc. After seeing the motor at work in the mine I am convinced that it has many good points to recommend it, but I have not changed my mind on the exhaust feature of it and as we said to you in our report one year ago: "On the theory that predominant gases resultant from complete combustion, we have C.O.2; and, from in-complete combustion we have a considerable quantity of C.O; it then becomes a question of the efficiency obtained from the combustion of the gasoline in the motor."

The type of gasoline motor in our mines here, work on the return current, and one who tells you there is no odor from it, mis-states the facts.

If permitted in our coal mines they should be under the strictest regulations consistent, not with a view to allowing installation of a device that was cheaper, but with safety.

It is the same old story, dollars saved, safety sacrificed.

I am re-producing an able article that has been published in one of our coal mining Journals, Coal Age, New York, N. Y., that gives the good and bad features of the Gasoline Motor and is one of the very best I have been able to get on that subject.

Abstract of a paper read before the West Virginia Coal Mining Institute, June 6, 1912, at Charleston, W. Va., by A. J. King, Mining Engineer.

For possibly thirty years gasoline motors have been used for various purposes on the Pacific Coast and in the Metal mines of the West, this development being brought about by the high cost of steam generation and in many cases by the scarcity of water in arid regions.

Stationary gasoline motors were first used in the mines of this state about 15 years ago, and about the same time the Prouty Company of Chicago, was advertising its manufacture

of gasoline haulage motors of different capacities for mine work. It has been since the advent of the automobile and during the past six years that manufacturers have seriously tried to develop a gasoline mine haulage motor which would satisfactorily meet mining conditions; and I am now given to understand that there are about three hundred in actual service.

In shape and appearance the gasoline locomotive closely resembles the electric motor, except that it has no trolly poles. The larger types of the gasoline locomotive require more height than an electric motor of the same weight. The cylinders, or combustion chambers, are water-jacketed to prevent undue heating and consequent sticking or binding of the piston. Excessive cooling of the cylinders, however, reduces the efficiency.

Rotation is always in one direction, so that the reversing is done by means of clutches and miter gears. They are usually constructed so as to run on full and on half-speed. Each motor is equipped with what is called a carbureter. Its office is to properly mix the air and gasoline in the cylinder. They are also equipped with an electric igniting device, which is so connected as to operate from a storage battery when the motor is starting, and thereafter from a magneto.

Some manufacturers also equip the motor with absorption chambers, the types and capacities differing with the size of the motor.

These absorption chambers are intended to absorb the carbon dioxide generated, and to cool the gases emitted. It is also claimed that these prevent the ignitions of fire-damp or coal dust in case the engine "back-fires."

The gasoline storage tanks are placed, in some makes, in the side of the motor frame, while in other types it is suspended within the frame, or is placed in a more or less exposed position. The repairs are said to cost about the same as for electric motors of the same power, but on account of the gasoline motor having reciprocating parts, the writer is inclined to believe that they cost more.

Advantages.

The advantages of the gasoline motors are as follows:

First. No power plant is needed to operate it, the power generating apparatus being a part of the motor. This saves fuel, labor, and maintenance charges of a power plant.

Second. Transmission wire lines or pipe lines are not needed and line losses and line maintenance are dispensed with.

Third. The motor is not affected or interrupted by short circuits, broken pipe lines or by drains upon the transmission lines by other motors.

Fourth. No trolley lines, hangers, bonds or cables are required; thus the labor for their installation, their cost and maintenance are saved.

Fifth. The motor aids in the humidification of the mine air.

Sixth. It is safer than a trolley wire equipment in that the mine employes are less liable to meet with injury through contact with the motor or its transmission lines.

Seventh. No time is lost in handling the trolley pole or wires; and in gathering it is unnecessary to attach and detach either transmission or haulage cables.

Disadvantages.

The disadvantages of the gasoline motor are:

First. The use of gasoline in the mine is dangerous because it readily volatilizes, and when mixed with air forms a very explosive gas.

Second. The combustion of gasoline in the combustion chambers extracts oxygen from the mine air.

Third. Carbon dioxide and free nitrogen remain after the perfect combustion of the gasoline.

Fourth. The carbureter is usually adjusted to furnish as nearly as possible the proper mixture of gasoline vapor and air when the motor is doing its heaviest work, so that if we assume that under these conditions we get perfect combustion, it is evident that when the engine is running with the locomotive standing, or when the motor is doing light work, we must get a more or less imperfect combustion, and this results in carbon monoxide being given off.

Fifth. The absorption chambers do not eliminate all of the carbon dioxide which is produced, nor do they prevent the carbon monoxide or free nitrogen from being discharged in the exhaust. At least this is my opinion.

Sixth. When the coal must be cut by mining machines, a power plant must be operated and maintained and transmission-lines both outside and inside the mine must be erected and kept in condition.

This plant need not be so large, however, as if haulage and cutting services were demanded of it.

Seventh. The gasoline motor costs from 25% to 50% more than an electric motor of the same power.

Eighth. It is also said that, due to its having but two speeds the gasoline motor will not start as large a trip as an electric motor.

Ninth. It will not take an over-load, as does an electric motor, according to some authorities, but it seems to me that the tractive effect in either case is dependent upon the weight of the motor, and, in the case of the gasoline locomotive the engines can be designated large enough to give the necessary torque.

Tenth. At the present time the gasoline motor cannot be safely used in a gaseous mine.

Chemistry of Combustion.

Gasoline is of that hydro-carbon series of which the typical formula is C H. Assuming a specific gravity of n 2n+2 of 0.70 at 32 deg. F. its formula would approximately be C_7H_{16}, which is called heptane. A gallon of this oil will weigh about 5.85 lb. Assuming that we get perfect combustion in the engine, we have the following chemical changes:

$$C_7H_{16}+22O=7CO_2+8H_2O$$

100 352 308 144

Which means that for every 100 lbs. of gasoline used, 308 lbs. of CO_2 are produced; that 352 lbs. of oxygen are abstracted from the mine air, and that 1178.2 lbs. of free nitrogen are the result (neglecting other constituents of mine air, and assuming that oxygen and nitrogen exist in the proportion of 23 and 77 per cent., respectively by weight).

Let us further assume that a five-ton motor is used, and that the consumption of gasoline per day is 2½ gal., per ton weight of motor. This motor would then consume 12½ gal., or 73.1 lbs. It would then produce 225 lbs., or 1921 cu. ft. of CO_2, 861.4 lbs., or 11,570 cu. ft. of nitrogen, and 105.26 lbs. of H_2O. It would rob the mine air of 257.3 lbs., or 3026 cu. ft. of oxygen.

There would, therefore, be produced, 1086 lbs., or 13,491 cu. ft. per eight-hour day, 1686 cu. ft. per hour, or 28.1 cu. ft. of blackdamp per minute. To keep the percentages of these gases below one, we would require a volume of 3000 cu. ft. of air passing per minute.

Increased Ventilation 1000 cu. ft. Per Ton.

If, however, we have incomplete combustion in the engine, carbon monoxide is produced, and the dangerous character of this gas, even one-tenth of one per cent., being injurious and poisonous if breathed for any length of time, makes it imperative that additional air be provided to make ventilation exceptionally good, and I would suggest that the quantity of air to be provided for the particular motor which we have under consideration be made 5000 cu. ft., per minute, say 1000 cu. ft. per ton of motor.

There are conditions in the mine under which the gasoline motor will operate satisfactorily, but its many advantages should not cause us to neglect or overlook the dangers incident to its use. When manufacturers practically eliminate any danger from carbon monoxide poisoning by building engines which will have perfect combustion under varying loads, and when the mine operator using them realizes that he must provide ample ventilation to carry away and dilute the noxious gases which they generate, we may then, with more assurance, say that the gasoline motor has come to stay.

Permissible Explosives.

Considerable correspondence and many interviews were had between representatives of a Powder company—furnishing the major part of the powder used in our coal mines—and representatives of the Bureau of Mines Department and this Department, relative to the demonstration of Permissible Powders for use in our Coal Mines in Montana.

The Du Pont Powder Company, at our solicitation, furnished powder free of cost, sent a representative Powder Expert, Mr. Anderson, of Denver, Colorado, to experiment with different brands and kinds of powder in our coal mines, and tests were made in Red Lodge, Bear Creek, Roundup, and in mines in Cascade County, with Monobel, principally.

There are, no doubt, many features to recommend the substitution of those explosives in our coal mines for black blasting powder for breaking down the coal; there are objectional features to their use also. At the time demonstrations were benig made in Red Lodge and in some of the mines in the Bear Creek field, the inspector was present and noted the conditions of shots before and after being blasted; some did splendid work with less powder than was used in those mines,

making good merchantable coal; others did not do so well and, of course, this was no surprise to me, in fact was expected; a man, no matter what his experience and training is, must get acquainted with each individual seam and field to get the best results.

It has been demonstrated by the Bureau of Mines Department, that there is far less liability of dust explosions from the use of Permissible Explosives than from the use of Black Blasting powder, in breaking down coal in mines where coal dust is readily inflammable, and, this feature, disregarding all others, should recommend their general adoption for coal mines.

I would say this, though, that I am a firm believer in tamping holes with needle and using squib for firing same; there are several reasons why; principal among them are: When holes are tamped with needle and fired with squib, it is a "Lead Pipe Cinch" that the hole has been properly tamped; and consequently, the initial cause of dust explosions is, to a very great extent, eliminated thereby.

Any powder that may be used, where the individual miner is the sole judge, of the position of the hole, depth, chance, amount of charge, is dangerous; especially is this so, if fuse are used whether fired with caps or not, and I believe there is added danger with the use of caps; as they are distributed over the entire mine among careful, competent, incompetent, and careless alike—I can cite you instances with lives lost through the use of caps in coal mines—and with fuse of any kind or character, there is going to be less tamping used, of course, this should not be, but it is the case, nevertheless.

Another very probable danger is the lee-way—the use of fuse—that is allowed or permitted for lighting more than one shot at a time in the same place—sometimes as many as five or six are lighted at the one time in the same place—now, many eminent mining men advocate that it would be much safer to fire those five or six shots simultaneously, by battery, than rotate.

It should be unnecessary to offer any argument against the bombarding idea, for history of mining has it recorded more than one accident has been caused from gases generated by the combustion of powder even in the absence of dust and Marsh gas.

It was with the idea in view of a meeting of the representatives of coal operators and miners, for Wage Scale, working

conditions, etc., and that each might take up this particular question intelligently that this department wrote each union of the U. M. W. of A., that such demonstrations would be held and we asked them to be represented at those demonstrations, and several unions had members present.

Without a battery system of firing shots or a safe, sane system of shot-firers, in our Montana coal mines, I do not think that the safety factor would be increased to any great extent, if any, by the substitution, at this time, of the powders and attachments necessary for their use.

Of the two systems—a safe, sane shot-firing system, or permissible powders without shot-firing, I would choose, for safety, shot-firing; battery system—when all were out of the mine—preferred.

I was called to Roundup to investigate a windy shot that had caused considerable flame and was to a more or less extent, perhaps, intensified by coal dust, that had happened in mine No. 2 of the Republic Coal Co., at Klein, Mont. I went into the mine and examined the rooms, 1, 2, 3, 4, 5, in the Second North East entries, also the room entry and the north air course of the main east, visiting this territory in company of Mr. Griffin, superintendent; Mr. Fletcher, foreman, and Mr. Brenn, chief mining engineer of the company. I also went over the same again with Mr. McAllister, Mr. Olin, Mr. Migro, employees of the company and representatives of the Miners' Union. Arriving on the scene several days after the explosion, things would not present the same appearance as they perhaps would immediately after the explosion.

Five rooms were gone through, props examined for evidences of heat having been there. I found scorched sight strings, scorched canvas, used for bratticing, scorched bark on the timber standing, and I gathered what I supposed was partially coked and charred coal dust from the side of the entry the rooms were turned off of, also from the rib of the north air course of Main East. I made three visits to that part of the mine, and after consulting some of the officials of both the company and of the Miners' Union, I concluded to hold a public investigation and take sworn testimony. This was done, and was held in the Miners' Union Hall at Klein and stenographic notes were taken of the proceedings by Mr. William Esmay.

While just such a course has never, to my knowledge, been

taken of any accidents other than fatal, in our Montana mines, I felt that it would be the best plan to have a public investigation of this, as far as I know, our initial dust explosion.

It was very fortunate indeed that this explosion, on April 15, 1911, occasioned very slight wounds to a few, and very little damage to property. This inspired the inspector to get all parties together and hear and take testimony of the conditions that obtained, before and after and what was seen, felt and heard during the time of the explosion; the methods practiced in placing of heavy charges of powder, tamping of same, quality and quantity of same, the number of holes charged and lighted at one time in the same place, system of firing shots, by whom and when, the method of working and the amounts of powder placed in holes, depths of same. the methods practiced with the ventilating apparatus at or just before firing time.

Every reason and incentive was in favor of a full, free, and open statement of the actual conditions attendant before, during, and after the explosion, for it was not for the purpose of trying to indict anyone for any criminal act, or to determine the responsibility for loss of life, for, thank God, there was no loss of life and very few serious accidents.

The entries in the Republic Coal Co's. No. 2 mine, at Klein, are driven triple entry system, the rooms of the north entries (only on one of the three entries are rooms turned off) are on the left hand entry of the three and the Second North East entry where the explosion occurred, about 3:20 p. m., April 15, 1911, just as the men were leaving off work, the last part of their duties for the day being the firing off oft he blasts of powder-charged holes.

The air current for this portion of the workings, is a split from the north air way of main east and conducted up the room entry of Second North East and returns out on both other entries paralleling same.

The mine has been very wet, but is drying up in different parts.

The coal seam, about six feet between walls, sometimes or pretty generally, is frozen to the roof and floor and the coal is very friable and the amounts of powder placed in holes break up the coal and cause considerable dust to accumulate.

The coal is shot off the solid; fuse used in both. wet and

dry holes; no needles or squibs used in the mine; dummies filled with small slack and fine dust are used for tamping the powder-charged holes; black blasting powder is used; with the exception of the entries, who are privileged to do some shooting at noon, the shooting is confined to the end of the shaft, 3:15 p. m., and the right hand or inside entry fires first, calling fire to the middle entry and they in turn call fire to the inside room entry, and so on, until all have lit their shots.

The number of shots a room or entry may light at one time, the amount of powder that may be used, the manner or method of placing holes, the depths of holes, width of the shot, is not defined by law or rules of the company governing this mine, except that all holes be drilled ahead of the cutting or shearing —for the purpose only of making a powder crack to make cutting or shearing easier, is discountenanced by rules of the company, discharge being the penalty.

It has been the custom for miners to use their own discretion in the tamping used, and the custom generally practiced, is filling dummies with fine slack and very often the holes are not tamped up to the mouth of the hole.

No. 1 room was about 100 feet deep by about 32 feet wide; No. 2 room about 122 by 32 feet; No.'s 1 and 2 rooms were connected by a cross-cut between them and was about midway from mouth of rooms to the face of them.

No. 3 room was about 67 feet deep and about 30 feet wide; No. 4 room about same depth and 28.5 feet wide; No. 5 room was about 47 feet deep and 27 feet wide; there were no cross-cuts driven between 3, 4, 5 rooms; fine coal and rock for road bed from 2 to 4 inches deep, some fine coal dust scattered by the shots fired were in those places, and while the dust was dry on the surface, it was moist when you began digging or scratching down through it, not wet, but damp; supposed to be in about the same condition as upon the day of the accident or explosion.

About 39 feet from center of No. 1 room to curtain or brattice cloth on slant between room entry and center entry of the three Second North East entries, the brattice cloth was scorched. About 73 feet from center of No. 1 room to the inside rib of north main east air course, where stopping was placed between two of the Second North East entries, stopping was blown down; about 100 feet from center of room entry to center of cross-cut between north air course and main east,

stopping was partially blown out. It was on the main entry opposite this cross-cut that the men felt the flame passing over them and burning, though not seriously, some of them. They threw themselves down on the floor to protect themselves, covering their heads with their coats.

I measured the current for this split and found 10,593 cu. ft. of air passing per minute. (Fan running at normal speed of about 70 revolutions per minute.)

I noticed on the east rib of room entry, Second North East, considerable very fine coal dust adhering to same from the floor to roof; also on north rib of north air course of east entry back as far as the cross-cut, where stopping was partially blown out; I noticed that sight strings in front of each of the rooms, 1, 2, 3, 4, 5, were scorched. I was told by several who were on the scene shortly after the explosion that considerable fine slack was piled up against the road opposite No. 3 room and a car at the switch, one end of which was off the track; I was told, and it was brought out in testimony, that the smoke was the densest and there was more heat in No. 3 room, immediately after the explosion; while the other room contained considerable smoke at the time, it was practically impossible to enter No. 3 room until after the room was bratticed up in the center and brattice carried up to the face and current of air turned in there; the lights were extinguished in trying to enter before bratticing same; from the testimony offered it was shown that there was considerable heat and flame which passed over several men out and back again on the parting or Lye on the north east haulage way. Afterdamp was also very noticeable in a very short time at the bottom of the hoisting shaft—this being the return of the mine—this was diluted quite a bit by the return from the currents from other parts of the mine; several miners were blown off their feet; one man testified that he was blown down and a car moved on his feet, holding him there for a time; others had caps and lamps blown off their heads; while the concussion is strong at times—from the heavy charges of powder used in the mine—the shock of this one was distinctly noticeable and was commented upon by several men who had congregated at the bottom of the shaft waiting to be hoisted up the shaft, as being something out of the ordinary. This place is about 1,400 feet from the initial point of the explosion.

Empty powder kegs were scattered along the entries for

quite a distance, rolls of paper scorched on the edges, dust on the rails, were found by those who went in immediately after the explosion, to relieve anyone that might have been caught in there; precautions were taken to make a minute examination of the places for men and to discover if any fire was in progress, for in the excitement at first, it was reported as a fire; some of those on the surface got a whiff of an odor of burning coal, but, as stated before, all the men had left their working places and were traveling toward the bottom of the hoisting shaft. No fire was discovered by the relief parties.

There was testimony offered to show that powder, other than that tamped in the holes, took part in the explosion, a bursted powder keg appearing as if the explosive force had been exerted from the inside of the keg, was offered in evidence. Indeed it would not be surprising to many if this was the case, as some of the miners were in the habit of keeping powder about them outside of boxes, although it was not definitely established that any powder was missing, and this is one of the few features of this investigation that was disappointing to the inspector.

On Saturday, April 15, 1911, at about 3:15 p. m., blasting of holes commenced in this part of the mine, with nine holes in the three entries that had about 25 feet of powder and in all probability weighed about 33 or more pounds; there were 13 holes fired in those series of rooms, 1, 2, 3, 4, and 5, which contained about 49 or 50 pounds of powder; the shots that lit first and in all likelihood exploded first, in the three entries were about 700 feet inside of room 5 and they were on the return part of this air current and would not take part in this disturbance; those 13 shots fired in the rooms with 50 pounds of powder or perhaps more, with the exception of a couple of shots, presumably in No. 5 room—no one, offering testimony, seemed able to testify whether there were any reports of shots going off after the explosion or not—those in No. 5 going off before this explosion took place, so there was apparently practically 45 pounds of powder exploding within a distance of, center to center of rooms 1 to 4, of about 180 feet at practically the same time.

The condition of the coal broken down with the shots—small—of more than one of the rooms in those five rooms, showed excessive use of powder, but the general consensus of opinions was that No. 3 room was the initial point of the explo-

sion, and from what was offered in testimony, by one of the men who worked in No. 3 room, relative to the position of the holes fired in there, one near the center of the room paralleling the right hand rib of the room with slight tendency toward the left hand side, the point of which was almost directly in line with a hole drilled parallel to face of room, pointed toward left hand rib, would indicate the flame of one shot communicated with the smoke and gases generated by the other, and from the fine coal dust in suspension, and dust lying about the room, and no doubt, some of this got mixed in the air current caused by the commotion and concussion, fed the flame and caused it to extend back against the intake current toward the fan, and in its path, perhaps exploded other kegs or parts of kegs of powder. Luckily, one of the stoppings gave way and caused a short circuit of the flame of the explosion to the return and where conditions were less favorable to propagation of the flame, the flame died out.

It was brought out in the testimony offered at the investigation, that dummies, filled with fine coal and slack, were used to tamp holes with; that fuse was used practically all over the mine, whether holes were wet or dry; that from two to four or more shots were fired in the same place and all lighted at the same time; no restrictions are placed upon purchasing of powder, or charging of holes, and it seemed to be the plan to light the fuse, holler fire, and get to the bottom as soon as possible, all taking pot luck.

To say that some of those in charge of the mine, and many of the miners working in it are not apprehensive of the dangers, would be mis-stating it, however, until the system is changed, we do not think this mine is immune from a repetition of like troubles and dangers.

For this department, if it had the authority to do so, to prescribe rules and regulations for greater safety in firing shots, placing of same, kind and quality of tamping, number of shots to be lighted at one time in each place, when and where to begin firing of shots, the amount of powder that would be allowed in one hole, who should fire those shots, when and how, what authority would be given those whose duty it would be to inspect and tamp holes, etc., would interfere with present agreement and wage scale. Agreements of this character run for a period of two years generally, and are mutual contracts or agreements between operators and miners; nevertheless, it

should be the aim of both operators and miners to waive some features of their contracts when it is thought advisable and would tend to minimize some of the dangers that exist.

This department is committed to the policy that it would be safer, cheaper and better for both the operators and miners, to have a system of inspection of the holes that are drilled to break down the coal, the charging of same, tamping and firing, in all of the coal mines in Montana. Firing to be done when all of the men were out of the mine.

The following notice was posted on the tipple of the Republic Coal Co.'s mine, No. 2, Klein, after investigation of explosion, and a copy of same handed to the superintendent of the mine:

"To Miners and Operators of Republic Coal Co., No. 2, Klein, Mont.

"Gentlemen—To avoid, if possible, a recurrence of just such, or perhaps a more destructive, both for life and property, explosion, as occurred on April 15, 1911, the following is advised by this department: To miners: To keep blasting powder in a box, securely locked, except when filling cartridges.

"Not more than one 25-pound keg of powder at one time in powder box.

"Keep powder box back from working face—in cross-cut, if no c. c. in room, on entry—far enough from face of entry to prevent the ignition of powder from flame of or sparks from shots.

"Do not keep two kinds of powder—black powder and dynamite—in, or caps and fuse in the same box with powder.

When opening keg, to open at place prepared by the factory. Do not use pick to open keg.

"Tamp powder charged holes with clay or other incombustible material—cut out slack and dummies. Tamp all holes, especially dry ones, to the mouth of the hole.

Lighted pipe or lighted lamp or other lighted thing should be kept at least five feet away from and so the sparks from same could not be carried to powder, when filling cartridges.

"More care and judgment should be used in placing holes, both as to number and position of same, the fewer holes fired for the same work, the better for all concerned.

"Holes that have been fired and failed to throw out the coal, work it off with picks. Do not split an old shot with another charge of powder, it is dangerous.

"Keep fine coal and dust loaded out from within 50 to 60 feet from the working face.

"Do not try and light all shots at once, give time for those lighting first on return current, to get by in safety.

"Do not place holes facing each other, or light two shots when one is depending on the action of the other.

Holes tamped with needle and fired with squib, in my judgment, are less dangerous than with fuse, and are more likely to be properly tamped; use copper needle and copper tipped tamping bar with dry holes, where practicable.

"Have two equal open faces before placing powder in the hole; help the powder and it will help you.

"Try and judge placing your holes to get down enough coal for a day's work with as few holes as possible, it will take less labor, less powder, and make better coal to load; shots are less liable to knock out timbers that have been set up.

"Do not get careless or reckless with placing, charging and firing holes, nor allow those working near you to do so, you have a right to object, your life may be at stake.

To Operators of No. 2 Mine.

I advise, until a better system is adopted, that you furnish tamping and distribute same in convenient places for miners requiring same, clay, soil, or other incombustible material for tamping powder charged holes.

The more general supervision of shots (placing same), instructions and advice along these lines to be given to those unacquainted with this seam, i. e. men just starting in, and, while firing of shots is going on, to see that the order of shooting from return out on the intake is carried out and in order.

More attention be given to those hired to handle explosives and none but competent men—experienced—be allowed to charge holes with powder, or shoot them—if incompetent or raw recruits are employed—place them under the supervision of competent men.

Section 1701, Chapter 3, Revised Codes, requires this. Section 1698, same chapter, imposes duties upon the inspector regarding unsafe conditions, etc., and I am satisfied that such exists, under the present system of blasting down coal and believe that dangers would be considerably minimized, if our suggestions regarding tamping, placing of holes, limiting num-

ber of same, supervision is heeded and enforced; also advise in dry and dusty places, to thoroughly sprinkle roof, sides and roadways and especially near working faces.

I believe that it should not require any argument, in the light of what has happened in your mine, to convince the most skeptical that your property and the miners' bodies are unduly hazarded.

I would suggest that experiments be made with permissible powders in your mine, to demonstrate its efficiency, cost and safety and adaptability, for breaking down your coal, with a view to substituting it if found suitable for the work.

I would earnestly suggest to you, that a system of shot-firing should be installed in your mine and "no shooting" be permitted in the same, during the hours the miners are at work."

Illuminating Oils for Coal Mines.

The law, after prescribing and defining in a technical way the Baume Test Hygrometer, Tagliabue, etc., the standard of illuminating oils that would be permitted compounded by manufacturers and sold by retailers and used by the coal miners in coal mines, provides, however, **that any material that is as free from smoke and bad odor, and of equal merit as an illuminant as a pure animal or vegetable oil, may be used at the pleasure of mine operators and miners.**

This, in our opinion, sets up another test and nullifies the intent and purposes of the chemical and laboratory test.

Smoke Box.

I have had constructed for this department a box, 36" "x13"x8" with six compartments which have glass slides in front; there are 1 1-2" holes bored in the top into which are fitted hoods to conduct the smoke from miners' lamps through the top of the box and over those holes are placed glass chimneys 8" long and fitted behind those chimneys is white muslin background; there are ¾" holes bored in the back of the boxes or compartments to admit of air when the glass slides are down in front; this apparatus is called a smoke box and is to make a physical test of illuminating oils used in the coal mines. I procured samples of oils from states that have similar laws to ours governing the quality of illuminating oils, properly labeled Cottonseed oil 84 per cent; Mineral oil 16 per cent; gravity of Cottonseed oil 22 degrees, Mineral oil, 25 degrees, gravity of mixture 24 degrees; and with Mr. J. J.

O'Neill, manager of the Continental Oil Co., Butte, Mont., and others, made the physical test described and I gave Mr. O'Neill the following statement:

Helena, Mont., Oct. 18, 1911.

To Whom It May Concern—A smoke test was conducted in the Capitol Building, in the office of State Coal Mine Inspector, on Tuesday, October 17, 1911.

Samples of oils from the Continental Oil Co., Butte, Mont., were submitted; a mixture complying with test set forth in our statutes: 84 per cent animal or vegetable oil or both, and 16 per cent Mineral, sample of Summer White Cottonseed oil, sample of Winter strained Lard oil, sample of 70 per cent Summer White Cottonseed oil and 30 per cent Mineral oil.

There were submitted two other samples of illuminating oils from two other states that have practically the same requirements for gravity, percentage of animal or vegetable or both, and mineral matter, as the Montana law requires.

After lighting and burning six lamps for two hours, I believe that the Summer White Cottonseed oil submitted, appeared, while the blaze was not as large, less illumination than some of the others, smokeless; sample of Winter strained Lard Oil submitted, I believe the illuminating power was greater than that of the Cottonseed oil; both of them crusted the wick more than any of the other four samples.

The 84 per cent Summer White Cottonseed and 16 per cent Mineral oil sample submitted was the equal as an illuminant of any of the oils tested and greater than the Summer White Cottonseed oil or the Winter strained Lard Oil. This oil made far less smoke than the samples submitted from other states supposed to have undergone similar test to ours.

The 70 per cent Summer White Cottonseed oil and 30 per cent Mineral Compound submitted, was the equal, if not the superior, as an illuminant, to those submitted from two other states and gave off less smoke than either of them and far less smoke than one of them.

Section 94 (a), Chapter 120, Session Laws of 1911, contains a proviso, which reads: "It is provided, however, that any material that is as free from smoke and bad odor, and of equal merit as an illuminant as pure animal or vegetable oil, may be used at the pleasure of operators and miners."

It is my judgment, after a cursory test, that the compound

70 per cent Summer White Cottonseed oil and 30 per cent mineral oils, called Crystal Oil, has some points that would commend it as a substitute under the provisions contained in Sec. 94 (a) and would suggest that a demonstration be made with various compounds, before representatives of operators and miners, to establish a standard to conform with the proviso quoted above.

Respectfully submitted,

J. B. McDERMOTT, State Coal Mine Inspector.

A very considerable number of our mine employees are adopting the Carbide lamp for use in the coal mines, and this will tend to increase the quality and decrease the cost of illuminating oils around the coal mines, more efficiently and quickly than anything else, it resolves itself into a supply and demand proposition. This department heartily endorses any and all makes of Carbide lamps we have seen, for use in the coal mines in Montana; giving as our reasons, better light, cleaner, cheaper, and very little trouble if given proper attention.

We propose, as stated in our letter, to let the standard be set up by operators and miners, the ones the law contemplated should be the judges and those most affected.

Wash Houses for Coal Mines.

Several complaints have been made to this department during the past two years regarding the condition of wash houses, heating, lighting and hot water pipes, etc., and in a few cases, we found the fixtures had been destroyed and nuisances committed in them; for a law that is to our notion a good one and is being generally adopted over the coal mining world, it does not receive the hearty support from operator and miner that it should. Of course, this is the exception, not the rule; but when any of the fixtures or appliances are stolen, or destroyed when furnished, it seems to me it is far more the concern of the employee than anyone else, and if they would—and they are the only ones that can furnish the evidence—bring an offender up to the bar of justice, when a few fines or terms of imprisonment had been imposed, it would have a good wholesome effect.

On the other hand, some of the operating companies discourage as much as possible the use of the wash house, by slighting, though making a stagger at cleaning them; if lockers, windows, lights. or any part of same become damaged, they

allow those troubles and annoyances to accumulate rather than try and do better than the law requires. In some instances, the furnishing of water is a serious problem for the operating end of it and when shower baths are used and then left running after the day's work, it wastes the water. Of course, no one is delegated or authorized to look after this and what is everybody's business is nobody's business.

Examination of Mine Scales.

The inspector has been called upon, several times, in different coal camps to make an examination of scales upon which the Miners' coal was being weighed, and we have this to say; that the chief cause of the trouble is the automatic device, self-registering dial. We realize the convenience of such an attachment—being able to weigh one ton, without handling of smaller weights—where considerable coal is run over a scale, from 100 to 3,000 tons per day of eight hours, it would be practically impossible to stop each car and adjust the weights as the different sized loads were run upon the scale, and handle that amount of coal. Nevertheless, we are of the opinion that the dial at best, only approximates, it does not weigh correctly.

We have, when making a test of a pair of scales at a coal mine, tried to have the weights of objects—test weights, 50 pounds each, standardized by the U. S. Government, car of coal—when weighed on the beam with small weights, 500, 1,000, 2,000 pounds weights, indicate the same amount when dial attachment was used, and in some cases, thinking the springs in the dial were worn out, ordered the companies to procure a new dial and find ourselves, after exhaustive trials, no nearer than with the old dials.

Meetings of the County Examining Boards, for Certificates of Competency. 1911 Period.

Meetings have been held in Musselshell County, Carbon and Cascade Counties and the following were granted certificates for holding like certificates issued by competent authorities in other states:

Robert E. Crenshaw, Carbon County.

James Deeble, Cascade County.

The following were granted service certificates:

J. R. Alcott, Havre, Mont.

James Latham, Sand Coulee, Mont.

R. W. Wilson, Sand Coulee, Mont.
Samuel Schultz, Windham, Mont.
Joseph Seman, Windham, Mont.

The following were granted certificates of competency after successfully passing the examinations:

Walter L. Thomas, Klein, Mont.
David B. Williams, Klein, Mont.
J. W. Carey, Klein, Mont.
David Bell, fire boss or mine examiner, Red Lodge, Mont.
Alexander Fairgrieve, Red Lodge, Mont.
Thomas F. Conway, Red Lodge, Mont.
William Wiseman, Red Lodge, Mont.
Thomas DeVenney, Red Lodge, Mont.
Richard Davis, Belt, Mont.
J. H. Wolliscroft, Sand Coulee, Mont.
John Pearson, Sand Coulee, Mont.
Anthony Morton, Sand Coulee, Mont.

One failed in Musselshell County and two failed in Cascade County.

The following paid $2.00 for examination fee and in some cases permits were granted to act in the capacity of mine foreman until they had an opportunity to appear before the board and take an examination:

Samuel A. Moss, Roundup, Mont.
James Brodie, Belt, Mont.
Henry Barber, Belt, Mont.
Hugh Lochray, Sand Coulee, Mont.
Thomas Lochray, Sand Coulee, Mont.
Adam Hadalin, Missoula County.
Marcial Vieze, Lewistown, Mont.
John Pitman, Havre, Mont.
August G. Nosen, Havre, Mont.
Charles Westman, Havre, Mont.

Total number of certificates issued at $5.00 each, 19....$95.00
Total examination fees collected at $2.00 each, 10 ..... 20.00
Total moneys collected and remitted to state treasurer.. 115.00

We have this to say regarding the opportunity offered for those ambitious ones to secure a certificate of competency, with very little cost to themselves, the record does not show an over supply of ambitious miners.

The law has been amended, during the recent session of the

legislature, now permitting two meetings of five days each, in each county, and provided ample funds to carry this out, but the requisite five applicants to the State Coal Mine Inspector, have not been forthcoming, so it was not necessary to call the meeting in some of our mining counties but once, and in others not any meetings have been held during this period.

Meetings of County Examining Boards. 1912 Period.

One service certificate, issued to Charles Toumi, Choteau County, 2-12-12.

Three fire boss or mine examiner certificates, Carbon County, 3-26-12.

John J. Jones, Washoe, Mont.
Andrew Laird, Washoe, Mont.
Benjamin Price, Washoe, Mont.

Five mine foreman certificates in Carbon County, 3-28-12.

David Bell, Red Lodge, Mont.
Wm. W. Owen, Bear Creek, Mont.
Thomas McGuire, Washoe, Mont.
James Castle, Washoe, Mont.
Wm. S. Good, Washoe, Mont.

Seven mine foreman certificates in Cascade County, 4-27-12.

Geo. W. Cooley, Sand Coulee, Mont.
Martin A. Feesum, Sand Coulee, Mont.
John J. Gibbons, Sand Coulee, Mont.
Moses Martindale, Sand Coulee, Mont.
J. W. Brodie, Belt, Mont.
James Brodie, Belt, Mont.
Herbert Barber, Belt, Mont.

Permits were granted to the following and application fee, $2.00, paid:

John Moses, Chimney Rock, Mont.
Joe Brown, Roundup, Mont.
A. E. Griffin, Klein, Mont.
William Day, Sand Coulee, Mont.

Application fee of $2.00 collected from Thomas McGuire after he had taken the examination for fire boss or mine examiner, he applied for and took examination for foreman and passed and received certificate.

Two men paid examination fee and failed, and one man paid examination fee and failed to appear before the board.

I have besides the total for above—$96.00—$3.00 belonging to Clarence Sargent, who paid me $5.00 when making application,

and failed; $3.00 must be returned to him, but I am holding same for return of official receipt or order from state examiner, releasing me on receipt issued.

J. B. McDERMOTT, State Coal Mine Inspector.

RECAPITULATION OF FEES AND CERTIFICATES.

1909 period	75 certificates issued	$5.00	$375.00
1910 period	39 certificates issued	5.00	195.00
1911 period	19 certificates issued	5.00	95.00
1912 period	16 certificates issued	5.00	80.00
Grand Total	149 certificates issued	5.00	745.00

During this entire time, the life of this law, there has been paid in for application, and parties either failed or neglected to appear and take examination, thereby forfeiting fee, the following:

Carbon County	3 failed	1 nonappearance.	
Cascade County	3 failed	3 nonappearances.	
Choteau County	5 failed		
Musselshell County	1 failed		
Total	12 failed	4 nonappearances.	
Total 16			$32.00

Permits have been issued to the following and they have paid fee of $2.00 and have had no opportunity to be examined:

Marcial Vieze	Fergus County	$2.00	
Adam Hadalin	Missoula County	2.00	
John Moses	Park County	2.00	
Wm. Day, Sr.	Cascade County	2.00	
Joseph Brown	Musselshell County	2.00	
A. E. Griffin	Musselshell County	2.00	
Total collected on permits outstanding		$12.00	
One application on hand from Musselshell County			$2.00
One application on hand from Carbon County			2.00
			$4.00
Grand Total collected for certificates issued			$745.00
Grand Total collected for examination fees			48.00
Total moneys collected			$793.00
Remitted to State Treasurer, November 1909			379.00
Remitted to State Treasurer, November 1910			203.00
Remitted to State Treasurer, November 1911			115.00
Remitted to State Treasurer, November 1912			96.00
Total Remitted to State Treasurer, 4 years			$793.00

Respectfully submitted,

J. B. McDermott, State Coal Mine Inspector.

Meetings of the Board of Examiners for Applicants for the Position of State Coal Mine Inspector for the State of Montana.

The board at present and during the life of this law up to the present time is composed of three members, one of whom must be recommended by a majority of the operators, one by the miners, and one mining engineer to be appointed by the Governor; Mr. C. C. Andersen, general superintendent of the Northwestern Improvement Company, was recommended by the operators; Mr. Richard Price was recommended by the miners; and Mr. Howard N. Stockett was chosen by the Governor.

There have been four meetings of the board since this law went into effect.

The first meeting of the board was held in June, 1909, for the purpose of organization and to outline the duties and for adopting rules and regulations for the government of the board meetings.

The second meeting, December, 1909, was held in Carbon County, and the name of Joseph B. McDermott was certified to the Governor as eligible for appointment, he having served one full term as State Coal Mine Inspector.

The third meeting of the board was held in Helena, Mont., in the office of the State Coal Mine Inspector, January, 1911, and the following were granted certificates and certified to the Governor as eligible for the appointment as State Coal Mine Inspector:

John Sanderson, Red Lodge, Mont.
Geo. N. Griffin, Roundup, Mont.
Thomas Good, Washoe, Montana.

The fourth meeting of the board was held in the capitol building, December, 1912, and the following were granted certificates:

Howard N. Stockett, Bear Creek, Montana.
William Franklin, Red Lodge, Montana.
Richard Price, Washoe, Montana.
Hirst Beever, Klein, Montana.
C. C. Andersen, Red Lodge, Montana.

The next regular meeting of the board for the purpose of examination, will be held in the capitol building, the second Monday in December, 1914.

CARBON COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	9	20.5	128,120
December, 1910	9	19.3	133,096
January, 1911	9	18.2	107,703
February, 1911	9	16.2	101,647
March, 1911	9	16.1	111,929
April, 1911	9	17	77,199
May, 1911	9	15	88,375
June, 1911	9	13.1	79,536
July, 1911	9	14	73,114
August, 1911	9	18.3	85,624
September, 1911	9	20.4	111,543
October, 1911	9	20	128,888
Total for 12 months			1,226,774

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	159,533.75
Lump Coal	770,039.05
Egg Coal	8,138
Nut Coal	83,341
Pea Coal	52,182
Slack	153,540
Total	1,226,774

Distribution.

	Tons.
Shipped on R. R. cars	1,064,069
Supplied locomotives	7,110
Sold local	18,005
Used at mines and wasted	137,590
Total	1,226,774

CASCADE COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	10	17.3	62,543
December, 1910	12	18.2	74,359
January, 1911	13	18.8	76,580
February, 1911	13	17.3	74,064
March, 1911	12	20.5	74,766
April, 1911	11	20	74,470
May, 1911	11	19.3	96,492
June, 1911	12	18.7	67,028
July, 1911	13	17	84,683
August, 1911	12	21	85,298
September, 1911	15	19	85,822
October, 1911	15	19.9	92,807.5
Total for 12 months			948,912.5

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	351,245.3
Lump Coal	527,597.7
Egg Coal	4,771
Nut Coal	20,214
Pea Coal	20,712
Slack	24,372.5
Total	948,912.5

Distribution.

	Tons.
Shipped on R. R. cars	885,526
Supplied locomotives	17,396
Sold local	10,791.5
Used at mines and wasted	35,199
Total	948,912.5

CHOTEAU COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	5	24	1,379
December, 1910	5	26	1,785
January, 1911	5	27	2,108
February, 1911	5	24	1,721
March, 1911	4	24.7	714
April, 1911	5	22.5	714
May, 1911	5	19.4	359
June, 1911	5	21	362
July, 1911	5	25	549
August, 1911	5	25	902
September, 1911	7	22.4	1,211
October, 1911	9	25.7	2,263
Total for 12 months			14,067

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	3,263
Lump Coal	10,681
Egg Coal	.....
Nut Coal	123
Pea Coal	.....
Slack	.....
Total	14,067

Distribution.

	Tons.
Shipped on R. R. cars	.....
Locomotive	30
Sold local	13,750
Used at mines and wasted	287
Total	14,067

CUSTER COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	1	26	584
December, 1910	1	26	871
January, 1911	1	26	879
February, 1911	1	24	774
March, 1911	1	26	430
April, 1911	1	26	312
May, 1911	1	24	170
June, 1911	1	24	98
July, 1911	1	23	110
August, 1911	1	24	115
September, 1911	1	26	210
October, 1911	1	26	485
Total 12 months			5,038

Kinds of Coal, Sizes, Produced.

Mine Run	5,038
Lump Coal	.....
Egg Coal	.....
Nut Coal	.....
Pea Coal	.....
Slack	.....
Total	5,038

Distribution.

Shipped on R. R. cars	.....
Supplied locomotives	.....
Sold local	5,038
Used at mines and wasted	.....
Total	5,038

FERGUS COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	4	22	657.6
December, 1910	4	20	522.5
January, 1911	4	11.9	644
February, 1911	3	13.9	503
March, 1911	4	17	488.8
April, 1911	4	18.2	554
May, 1911	4	19	503
June, 1911	4	19.7	609
July, 1911	4	20.2	456
August, 1911	4	18	393
September, 1911	4	20.7	683
October, 1911	4	20.7	653
Total for 12 months			6,666.9

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	3,971.9
Lump	2,695
Egg Coal	.....
Nut Coal	.....
Pea Coal	.....
Slack	.....
Total	6,666.9

Distribution.

	Tons.
Shipped on R. R. cars	.....
Locomotive	.....
Sold local	6,656.9
Used at mines and wasted	10
Total	6,666.9

GALLATIN COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	1	26	1,470
December, 1910	1	26	2,084
January, 1911	1	26	1,430
February, 1911	1	25	1,073
March, 1911	1	25	790
April, 1911	1	25	760
May, 1911	1	25	568
June, 1911	1	25	606
July, 1911	1	25	624
August, 1911	1	25	626
September, 1911	1	25	480
October, 1911	1	25	290
Total			10,801

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	10,801
Lump Coal	.....
Nut Coal	.....
Pea Coal	.....
Slack	.....
Total	10,801

Distribution.

	Tons.
Shipped on R. R. cars	3,636
Supplied locomotives	77
Sold local	234
Used at mines and wasted	6.5
Total	10,801

MUSSELSHELL COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	3	17.2	47,541
December, 1910	3	22.7	69,286
January, 1911	3	17.2	54,617
February, 1911	3	13.9	50,211
March, 1911	3	16.8	50,419
April, 1911	3	16.4	53,170
May, 1911	3	13.2	38,767
June, 1911	3	21.2	45,148
July, 1911	3	21.2	45,060
August, 1911	3	23.8	52,254
September, 1911	3	26.5	58,534
October, 1911	3	26.5	78,639
Totals for 12 months			643,646

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	385,396
Lump Coal	95,569.8
Egg Coal	4,225
Nut Coal	75,733
Pea Coal	43,889
Slack	38,834
Total	643,646

Distribution.

	Tons.
Shipped on R. R. cars	611,589
Supplied locomotive	.....
Sold local	5,275
Used at mines and wasted	26,782
Total	643,646

PARK COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	2	22.5	6,617
December, 1910	2	23.5	6,977
January, 1911	2	18.5	6,026
February, 1911	2	13.5	4,885
March, 1911	2	13.5	3,725
April, 1911	2	13.5	2,756
May, 1911	2	13	1,631
June, 1911	2	11	1,727
July, 1911	2	15	2,501
August, 1911	2	20	4,525
September, 1911	2	23.5	6,602
October, 1911	2	22.5	6,967
Total for 12 months			54,759

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	2,982
Lump Coal	24,214
Egg Coal	3,570
Nut Coal	13,841
Pea Coal	3,194
Slack	
Total	54,759

Distribution.

	Tons.
Shipped on R. R. cars	45,313
Supplied locomotives	54
Sold local	533
Used at Mines and wasted	8,859
Total	54,759

VALLEY COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1910	1	26	529
December, 1910	1	26	81
January, 1911	1	26	254
February, 1911	1	26	121
March, 1911	1	26	28
April, 1911	1	26	223
May, 1911	1	26	409
June, 1911	1	26	521
July, 1911	1	26	98
August, 1911	1	26	59
September, 1911	1	26	104
October, 1911	1	26	245
Total for 12 months			2,742

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	2,742
Lump Coal	.....
Egg Coal	.....
Nut Coal	.....
Pea Coal	.....
Slack	.....
Total	2,742

Distribution.

Shipped on R. R. cars	.....
Supplied locomotives	.....
Sold local	2,542
Used at mine and wasted	200
Total	2,742

BLAINE COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1911	1	20	1,036
December, 1911	2	19.5	645.2
January, 1912	2	22.6	853.2
February, 1912	2	22.5	482.3
March, 1912	2	22.5	593.2
April, 1912	2	22.5	167.2
May, 1912	1	18.9	18.9
June, 1912	2	15	164
July, 1912	2	18	282
August, 1912	2	12.5	309
September, 1912	2	12.5	516
October, 1912	2	13.5	653
Total for 12 months			5,720

Kinds of Coal, Sizes, Produced.

Mine Run	.....
Lump Coal	5,720

Distribution.

Shipped on R. R. cars	.....
Sold local	5,720

CARBON COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	7	21.7	127,649.2
December, 1911	7	23.1	140,769.5
January, 1912	7	21	127,101.2
February, 1912	7	13	80,338.5
March, 1912	7	19	112,240.35
April, 1912	7	14.2	89,892.35
May, 1912	7	17.5	95,350.3
June, 1912	8	12.7	74,145.15
July, 1912	8	14.3	92,246.7
August, 1912	8	18.7	106,380.7
September, 1912	8	20	116,049.5
October, 1912	8	18.7	105,422.2
Total for 12 months			1,267,585.75

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	131,481
Lump Coal	820,039
Egg Coal	19,755
Nut Coal	89,072
Screenings, Pea, mixed coals	116,498
Slack	90,470
Total	1,267,585.75

Distribution.

	Tons.
Shipped on R. R. cars	1,082,723
Locomotive Coal	5,529
Sold local	19,227
Used at mines and wasted	160,106
Total	1,267,585.75

CASCADE COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	15	22	94,423.8
December, 1911	14	20.8	84,132
January, 1912	15	20.6	81,368
February, 1912	15	15	62,831
March, 1912	14	17.7	69,563
April, 1912	14	16	65,177
May, 1912	14	18	65,520.6
June, 1912	14	15.7	58,917.4
July, 1912	13	16.5	53,189.5
August, 1912	11	20	63,862
September, 1912	12	20	73,900
October, 1912	13	22	77,972
Total for 12 months			850,858.3

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	242,442
Lump Coal	460,144
Egg Coal	53,088
Nut Coal	17,219
Nut, 1 and 2 mixed	4,607
Pea Coal	1,871
Slack	71,486
Total	850,858

Distribution.

	Tons.
Shipped on R. R. cars	784,960
Locomotive Coal	3,833
Sold local	14,183
Used at mines and wasted	47,883
Total	850,858

CHOUTEAU COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	2	26	962
December, 1911	2	23	1,072
January, 1912	2	23	1,072
February, 1912	2	23	1,329
March, 1912	2	23	1,286
April, 1912	2	23	1,026
May, 1912	2	23	1,006
June, 1912	2	23	358
July, 1912	2	23	487
August, 1912	2	23	433
September, 1912	2	23	489
October, 1912	2	23	566
Total for 12 months			10,086

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	2,153
Lump Coal	2,249
Egg Coal	3,113
Pea Coal	600
Slack	1,971
Total	10,086

Distribution.

	Tons.
Shipped on R. R. cars	7,333
Locomotive Coal	500
Sold local	2,153
Used at mine and wasted	100
Total	10,086

CUSTER COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	1	25	898
December, 1911	1	25	832
January, 1912	1	25	863
February, 1912	1	25	568
March, 1912	1	25	577
April, 1912	1	25	179
May, 1912	1	25	179
June, 1912	1	2	36
July, 1912	..	....	.....
August, 1912	..	....	.....
September, 1912	1	10	153
October, 1912	1	10	312
Total for 12 months			4,527

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	4,087
Lump	.....
Slack	440
Total	4,527

Distribution.

	Tons.
Shipped on R. R. cars	.....
Supplied locomotives	.....
Sold local	4,491
Used at mine and wasted	36
Total	4,527

FERGUS COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	4	23:7	610
December, 1911	2	24	599
January, 1912	4	24.3	570
February, 1912	4	20	473
March, 1912	3	25.6	332
April, 1912	3	25.3	242
May, 1912	3	19.3	275
June, 1912	3	19	309
July, 1912	2	18.5	182
August, 1911	3	20.6	325
September, 1912	4	19.7	474
October, 1912	4	21	556
Total for 12 months			4,947

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	3,205
Lump Coal	1,542
Nut Coal	200
Total	4,947

Distribution.

	Tons.
Used at Quartz Mill	1,000
Local trade	3,935
Used at mines and wasted	12
Total	4,947

GALLATIN COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	1	25	538
December, 1911	1	26	730
January, 1912	1	26	728
February, 1912	1	24	674
March, 1912	1	25	702
April, 1912	1	12	315
May, 1912	..	....	.....
June, 1912	..	....	.....
July, 1912	..	....	.....
August, 1912	..	....	.....
September, 1912	..	....	.....
October, 1912	..	....	.....
Total for 12 months			3,687

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	3,687

Distribution.

	Tons.
Shipped on R. R. cars	.....
Sold local	115
Used at mines and wasted	3,572
Total	3,687

HILL COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1912	5	20.4	2,052.2
December, 1911	5	21	1,664
January, 1912	5	21.2	2,015
February, 1912	5	21	1,740
March, 1912	5	21.1	1,636
April, 1912	4	19.3	1,218
May, 1912	3	16.2	873
June, 1912	3	16.2	710
July, 1912	2	15.5	628
August, 1912	2	19.5	742
September, 1912	5	17.8	1,357
October, 1912	5	21.2	2,062
Total for 12 months			16,686.7

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	8,991
Lump Coal	7,668
Nut Coal	28
Total	16,687

Distribution.

	Tons.
Shipped on R. R. cars	1,190
Sold local	15,467
Used at mines and wasted	30
Total	16,687

MUSSELSHELL COUNTY.

DATE.	No. of mines.	Days operated.	Production, Tons.
November, 1911	4	23.5	88,334
December, 1911	4	22.7	94,701
January, 1912	4	23.6	100,170
February, 1912	4	20.9	79,549
March, 1912	4	18.2	73,915
April, 1912	4	18	67,992
May, 1912	4	19.2	62,090.5
June, 1912	4	18.6	51,188.6
July, 1912	3	20.5	77,631
August, 1912	4	20.7	91,698
September, 1912	5	17.6	70,892.7
October, 1912	5	21.9	75,323
Total for 12 months			933,485

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	613,578
Lump Coal	126,259
Egg Coal	6,935
Nut Coal	94,278
Nut, 1 and 2 mixed	25,516
Pea	636
Slack	66,283
Total	933,485

Distribution.

	Tons.
Shipped on R. R. cars	891
Sold local	7,919
Used at mines and wasted	34,638
Total	933,485

PARK COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	2	24	7,105.5
December, 1911	2	22	6,626
January, 1912	2	23.2	6,393
February, 1912	2	11	3,376
March, 1912	2	21.2	5,380
April, 1912	2	12	2,399
May, 1912	2	13	2,085
June, 1912	2	12.3	1,412
July, 1912	2	13	1,764
August, 1912	2	18.9	2,220
September, 1912	2	21.8	2,836
October, 1912	2	26	3,800
Total for 12 months			45,396.5

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	3,681
Lump Coal	21,589
Egg Coal	2,962
Nut Coal	10,628
Pea Coal	6,536
Total	45,396

Distribution.

	Tons.
Shipped on R. R. cars	42,790
Supplied locomotives	20
Sold local	607
Used at mines and wasted	1,979
Total	45,396

VALLEY COUNTY.

DATE.	No. of mines.	Days operated.	Production. Tons.
November, 1911	1	26	195
December, 1911	1	26	178
January, 1912	1	26	151
February, 1912	1	26	96
March, 1912	1	26	200
April, 1912	..	....	.....
May, 1912	..	....	.....
June, 1912	..	....	.....
July, 1912	..	....	.....
August, 1912	..	....	.....
September, 1912	..	....	.....
October, 1912	..	....	.....
Total for 12 months			820

Kinds of Coal, Sizes, Produced.

	Tons.
Mine Run	....
Lump	770
Slack	50
Total	820

Distribution.

	Tons.
Shipped on R. R. cars	....
Supplied locomotives	....
Sold local	770
Used at mine and wasted	50
Total	820

TOTAL TONNAGE OF COAL PRODUCED EACH MONTH IN 1911 PERIOD.

	Tons.
November, 1910	249,440.6
December, 1910	289,061.5
January, 1911	250,241
February, 1911	234,999
March, 1911	243,359.8
April, 1911	209,978
May, 1911	227,274
June, 1911	195,635
July, 1911	207,195
August, 1911	229,796
September, 1911	265,189
October, 1911	311,237.5
Total	2,913,406.4

Kinds of Coal, Sizes, Produced in 1911 Period.

	Tons.
Mine Run	924,882
Lump Coal	1,437,796.15
Egg Coal	20,704
Nut Coal	193,287
Pea and Engine Coal	125,976
Slack	210,760
Total	2,913,406

Distribution.

	Tons.
Shipped on R. R. cars	2,610,133
Supplied locomotives	24,667
Sold local	49,362.4
Slack used at mines and wasted	229,244
Total	2,913,406

TOTAL TONNAGE OF COAL PRODUCED EACH MONTH IN 1912 PERIOD.

	Tons.
November, 1911	323,801
December, 1911	331,938
January, 1912	321,285
February, 1912	231,456
March, 1912	266,374
April, 1912	228,657
May, 1912	227,327
June, 1912	187,240
July, 1912	226,410
August, 1912	265,969
September, 1912	266,666
October, 1912	266,676
Total	3,143,799

Kinds of Coal, Sizes, Produced in 1912 Period.

	Tons.
Mine Run	1,013,305
Lump Coal	1,445,982
Egg Coal	85,853
Nut Coal	211,424
Nut, 1 and 2 mixed	30,123
Pea Coal	126,140
Slack	230,972
Total	3,143,799

Distribution.

	Tons.
Shipped on R. R. cars	2,809,925
Supplied locomotives	9,882
Sold local	75,587
Used at mines and wasted	248,405
Total	3,143,799

PRODUCTION OF COAL IN MONTANA.

Figures Gathered by U. S. G. S., Washington, D. C.

Date.	Production.	Average men employed.
1880	224	Not reported.
1881	5,000	" "
1882	10,000	" "
1883	19,795	" "
1884	80,376	" "
1885	86,440	" "
1886	49,486	" "
1887	10,202	" "
1888	41,467	" "
1889	363,301	" "
1890	517,477	1,251
1891	541,861	1,119
1892	564,648	1,158
1893	892,309	1,401
1894	927,295	1,782
1895	1,504,193	2,184
1896	1,543,445	2,335
1897	1,647,882	2,337
1898	1,479,803	2,359
1899	1,496,451	2,378
1900	1,661,775	2,376
1901	1,396,081	2,158
1902	1,560,823	1,938
1903	1,448,810	2,155
1904	1,358,919	2,505
1905	1,643,832	2,181
1906	1,829,921	2,394
1907	2,016,857	2,735
1908	1,920,190	3,146
1909	2,553,940	4,535
1910	2,920,970	3,837

The figures are not yet available for 1911 and 1912 Calendar years.

Figures Gathered by Howard F. Welsh and J. B. McDermott, Inspectors.

Date.	Production.	Men employed.
1901	1,442,569	2,158
1902	1,502,115	1,938
1903	1,514,538	2,418
1904	1,471,504	1,813
1905	1,743,771	2,289
1906 (10 months—Fiscal year	1,502,200	2,309
1907	2,030,564	3,229
1908	1,978,347	3,642
1909	2,541,679	3,862
1910	2,970,246	4,117
1911	2,913,406	3,776
1912	3,143,799	3,598
1906—Added 2 months	250,366	.....
Total production	25,005,104	

The average production per year since the Department of Coal Mine Inspector was created, 12 years, 2,083,759 tons.

The average number of men employed for the same period was 2,929. In this is included Rope-riders, Cagers, Laborers, Machinemen, Loaders, boys underground, boys above ground, Motormen and Nippers, Miners, Shot-firers, Timbermen, Trackmen, Trappers, others underground and all above ground.

NUMBER OF COAL MINES; NUMBER OF DAYS OPERATED, HAND MINED AND SHOT OFF SOLID; MACHINE MINED; AND VALUE OF PROUCT AT MINES; GROUPED IN COUNTIES FOR 1912 PERIOD.

COUNTY.	Number of Mines.....	Number of days operated.....	Hand mined and shot off solid.....	Machine mined.....	Value. Selling price at mine.....
Valley	1	312	2,742	.....	$ 5,482.00
Custer	1	301	5,038	.....	14,689.00
Fergus	4	233	6,666.9	.....	14,689.00
Gallatin	1	303	10,801	.....	19,279.79
Chouteau	9	168	14,067	.....	23,771.00
Park	2	210	54,759	.....	117,658.40
Musselsheli	4	234	594,412	49,234	1,126,384.00
Cascade	16	177	142,276	806,636	1,482,572.22
Carbon	9	207.4	1,016,556	1,210,218	2,100,784.42
Totals	47	Av. 238.4	1,847,317.9	1,066,088	$4,904,620.88
Total Coal				2,913,405.9	

NUMEER OF COAL MINES; NUMBER OF DAYS OPERATED, HAND MINED AND SHOT OFF SOLID; MACHINE MINED; AND VALUE OF PROUCT AT MINES; GROUPED IN COUNTIES FOR 1912 PERIOD.

COUNTY.	Number of Mines.....	Number of days operated.....	Hand mined and shot off solid.....	Machine mined.....	Value. Selling price at mine.....
Valley	1	130	820	.....	$ 1,927.00
Gallatin	1	138	3,687	.....	5,588.00
Custer	1	190	4,527	.....	13,031.00
Blaine	2	193.5	5,720.9	.....	16,745.00
Fergus	4	213.7	4,947	.....	11,867.50
Chouteau	2	276	10,086	.....	24,223.50
Hill	5	194.4	16,687	.....	38,864.22
Park	2	218.5	45,396	.....	105,906.00
Cascade	16	191	226,054	624,803.6	1,338,975.89
Musselshell	5	200.4	723,144	201,341	1,680,273.00
Carbon	8	197.5	1,019.472	248,114	2,362,695.89
Total	47	Av. 195	2,069,540	1,074,258.6	$5,600,097.00
Total coal				3,143,799	

OCCUPATIONS OF THOSE EMPLOYED IN AND AROUND COAL MINES IN MONTANA. PERIOD OF 1911.

COUNTY.	Rope riders	Cagers	Drivers	Laborers	Loaders	Machinemen	Boys under ground	Boys above ground	Motormen and nippers	Miners	Shot firers	Timbermen	Trackmen	Trappers	Others under ground	All above ground	Total employees
Valley	...	...	1	...	...	...	...	...	...	5	...	...	...	...	...	...	6
Custer	...	...	1	2	...	...	...	...	...	6	...	...	...	...	...	...	9
Fregus	...	...	1	...	...	...	...	...	...	11	...	...	...	...	...	...	12
Gallatin	...	...	1	...	...	...	...	...	...	11	...	...	...	...	...	...	12
Chouteau	1	...	4	3	...	...	...	...	...	37	...	...	...	...	...	7	52
Park	3	...	4	...	...	...	1	...	...	66	...	2	1	1	1	21	106
Musselshell	2	2	58	85	8	4	4	2	2	518	...	10	12	3	...	112	822
Cascade	8	...	81	83	258	181	...	...	...	180	18	27	22	11	...	222	1,091
Carbon	12	...	52	33	169	35	8	12	40	881	2	55	37	3	61	266	1,666
Total	26	2	203	206	435	220	13	14	42	1,715	20	94	72	18	68	628	3,776

OCCUPATIONS OF THOSE EMPLOYED IN AND AROUND COAL MINES IN MONTANA. PERIOD OF 1912.

COUNTY.	Rope riders	Cagers	Drivers	Laborers	Loaders	Machinemen	Boys under ground	Boys above ground	Motormen and nippers	Miners	Shot firers	Timbermen	Trackmen	Trappers	Others under ground	All above ground	Total employees
Valley	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	4
Gallatin	1	...	...	1	...	...	...	...	...	9	...	...	...	...	3	5	19
Custer	...	...	...	...	...	...	...	...	...	6	...	...	...	...	1	1	8
Blaine	...	...	2	...	...	...	...	...	...	6	...	...	...	...	...	...	8
Fergus	1	...	...	...	...	...	...	...	...	10	...	...	...	...	...	1	12
Chouteau	1	...	...	...	...	7	...	...	...	11	...	...	...	...	...	8	27
Hill	...	...	4	...	...	1	...	...	...	22	...	...	1	...	1	3	32
Park	2	...	2	5	...	...	1	2	...	63	...	1	1	1	3	16	97
Cascade	10	...	72	27	137	185	5	15	...	255	15	21	22	14	46	173	997
Musselshell	2	2	72	15	10	150	4	...	8	449	...	10	18	1	44	101	886
Carbon	11	...	43	58	34	220	1	12	41	703	1	51	37	3	60	233	1,508
Total	28	2	195	106	181	563	11	29	49	1,538	16	83	79	19	158	541	3,598

OFFICE OF STATE COAL MINE INSPECTOR.

Year	Average employed	Asphyxiated—Killed	Asphyxiated—Injured	Gas and dust explosions—Killed	Gas and dust explosions—Injured	Powder explosions—Killed	Powder explosions—Injured	Falling of roof, coal and timber—Killed	Falling of roof, coal and timber—Injured	Moving cars, motors and cables—Killed	Moving cars, motors and cables—Injured	All other causes—Killed	All other causes—Injured	Totals—Killed	Totals—Injured
1901	2,158	....	....	....	....	....	2	4	10	1	8	2	5	7	25
1902	1,938	....	....	....	....	1	2	3	6	1	....	7	7	12	15
1903	2,418	....	....	....	2	....	4	4	12	1	6	....	15	5	37
1904	1,813	....	....	....	2	....	1	7	14	2	12	....	2	9	31
1905	2,289	....	....	....	2	....	2	7	13	1	3	....	3	8	23
1906	2,309	8	14	....	4	....	2	3	20	....	7	2	8	13	55
1907	3,229	....	....	....	3	....	1	8	24	1	15	4	6	13	49
1908	3,642	9	12	....	6	1	5	7	27	2	13	2	5	21	68
1909	3,862	....	....	....	2	1	2	9	20	....	....	1	20	11	44
1910	4,117	....	....	....	3	....	4	7	24	5	13	....	7	12	51
1911	3,776	....	....	....	....	1	5	10	23	2	12	....	6	13	46
1912	3,598	1	....	....	1	1	4	4	27	1	13	....	7	7	52
Total	.....	18	26	....	23	5	34	73	220	17	102	18	91	131	496

Total men employed, 35,149.
Average per year, 12 years, 2,929.
Total tonnage, 12 years, 25,005,104.
Average tonnage per year, 2,083,759.
Average tonnage per death, 190,879.
Average tonnage per serious accident, 50,434.
One fatal accident for each 268 employed.
One serious accident for each 71 employed.
Percentage per 1,000 employed, killed, 3.73%.
Percentags per 1,000 employed, injured, 14.1%.

FATAL ACCIDENTS IN THE COAL MINES OF NORTH AMERICA, 1902 TO 1911—RATE OF PERSONS KILLED PER 1,000 EMPLOYED.

Figures Taken From Coal Age, Issue of January 18th, 1913, Prepared by F. L. Hoffman, Statistician, Prudential Insurance Company, Newark, N. J.—Figures for Montana Corrected by State Coal Mine Inspector, J. B. McDermott, Helena, Montana.

STATE.	Date 1902	Date 1903	Date 1904	Date 1905	Date 1906	Date 1907	Date 1908	Date 1909	Date 1910	Date 1911
Missouri	1.09	1.85	1.09	1.06	1.65	1.70	1.06	2.31	1.55	0.80
Kentucky	1.58	1.85	1.37	2.06	2.39	1.82	2.15	1.76	3.97	1.78
Iowa	4.23	1.59	1.81	1.36	2.20	2.05	2.20	1.56	2.17	2.13
Maryland	1.89	2.82	2.11	2.57	2.10	0.85	2.00	3.34	2.93	2.17
Indiana	1.83	3.64	1.91	2.63	1.58	2.79	2.36	2.64	2.41	1.68
Nova Scotia	2.36	2.79	1.63	1.86	2.31	2.89	3.02	2.73	2.82	2.87
Ohio	2.16	3.00	2.57	2.58	2.71	3.20	2.23	2.45	3.32	2.25
Michigan	4.24	2.54	2.58	2.16	2.83	2.43	1.94	3.04	2.43	2.74
Illinois	2.15	3.13	2.87	3.36	2.49	2.47	2.58	2.93	5.44	2.03
Pennsylvania Bit.	3.36	2.65	3.44	2.90	2.76	4.40	3.15	2.72	2.79	2.82
Kansas	3.22	3.61	3.09	2.97	2.95	4.35	2.74	2.83	2.26	3.56
Pennsylvania Ant.	2.03	3.41	3.69	3.83	3.35	4.19	3.89	3.31	3.57	4.03
Utah	3.24	3.21	4.06	3.57	3.69	3.07	2.99	5.36	4.38	4.21
Montana	6.19	2.07	4.96	3.49	5.63	4.03	5.77	2.85	2.91	3.44
Oklahoma	9.62	5.42	3.63	5.76	4.81	4.15	3.02	2.78	5.43	3.54
West Verginia	3.41	4.03	3.08	3.88	5.20	6.33	10.35	5.85	5.00	4.90
Washington	7.83	5.13	6.69	2.61	4.08	6.05	4.68	6.81	7.15	6.18
Tennessee	25.80	2.69	2.81	2.76	3.07	2.79	3.06	2.62	3.40	10.37
New Mexico	10.11	7.26	7.61	2.35	3.82	10.13	9.26	5.57	4.89	4.21
Alabama	2.79	2.94	4.77	10.75	5.23	7.61	5.75	6.40	10.81	9.20
Colorado	8.11	3.89	8.26	5.05	7.32	7.67	4.25	7.53	21.60	5.94
British Columbia	34.65	9.85	8.31	2.72	3.12	5.12	2.95	8.88	3.61	2.33
Averages	3.48	3.16	3.33	3.40	3.20	4.15	3.84	3.39	4.17	3.49

On 31st day of December 1910, John Hille, a miner working in Mine A, of the Roundup Coal Mining Company, was killed by a fall of rock.

The Coroner's Jury Verdict was: "That John Hille came to his death by an accidental fall of rock and find no one responsible and the manner and means by which death was produced was not felonious."

Albert Stockman, a miner working in Mine A, of the Roundup Coal Mining Company received injuries from the effects of which he died.

On January 19th, 1911, he was injured and died on February 6th following. From the appearance of the place when visited by me a few days after the accident occurred it looked as though he was mining out a standing shot and the coal, when falling toward him and he backing away from it, he was tripped or caught and his foot cut or bruished badly.

There was evidences of his having bled freely. No Inquest was held on the body of Stockman but it was suggested that he had died from other causes, be that as it may there was nothing connected with the accident in the mine that would or

could in any way incriminate anyone connected with the operation of the mine, if as it was stated to us, he was mining out a part of a standing shot and a piece of coal fell over on him, he might have received injuries that would have caused his death and it could have been properly classed an accident unforseen.

William Lishman was working in No. 2 mine at Klein, the property of the Republic Coal Co., and on the morning of March 4th, 1911, with his partner and Father-in-law, Robert Smith, went to their working place, room 5, 2nd. South East in No. 2 mine and began to load a car of coal when a large piece of the roof dropped out between the props and fatally injured Mr. Lishman. Mr. Smith testified that he usually examined the roof before starting to load coal but this morning did not do so, thinking it was safe enough with the number of props that were set up and said, "I believe it was one of those unforseen accidents and I do not think any one to blame or could be held responsible for it."

John Miskan lost his life in a Coal Mine owned and operated by Sam Schultz, on Sage Creek, on April 15th, 1911, by coal falling on him.

Verdict of Coroner's Jury was: John Miskan came to his death from a fall of coal, falling upon him, in Sam. Schultz mine, on Sage Creek, Fergus County, on April 15th, 1911, from injuries received in said mine on April 11, 1911, at about the hour of 1:30 P. M. And we further find there was no responsibility attached to any one concerned.

December 30th, 1910, an accident caused the life of Antone Prosnek to be crushed out of him, he and his partner were taking off a skip of some room necks off the slope in Maxey Brothers mine when a large piece of the coal fell on him and from the evidence of the partner of the man and others there just after the accident occurred, the Coroner's Jury returned a verdict to the effect: "Said death was the result of the injuries sustained by the falling of a large piece of coal on him. Death was purely accidental and blame can be placed on no one."

Joe Kranz lost his life in the Maxey Brothers mine on Trail Creek December 17th, 1910, by being crushed between car and rib of room.

The method of working this part of the mine was: Hoist was located on top of a slope and rooms turned off the slope with switches up the hill and rooms driven on the strike of the vein.

Joe Kranz was out at mouth of room waiting for the Rope rider to pull his car and when trip came up the slope and passed the switch leading into Kranz's room the rope rider pumped off the trip and threw the latches for Kranz's room and belled the engineer, part of the trip came loose and ran into the switch and jumped the track and crashed against the lower rib of room and crushed the life out of Kranz, who was sitting there.

From the testimony offered by rope rider it was not necessary or customary for miners to be out on the slope or near it when he was changing their cars and if Kranz had been in his working place the accident would not have happened to him.

Coroner's Jury Verdict was: "That he came to his death on December 17th, 1910 about 10:40 A. M., from injuries received through accident at lower corner of room neck (room 14) Maxey mines, Chimney Rock, Park County, Montana. Nobody to blame.

Theodore Mike, a driver, was found dead and lying under a loaded car of coal in the Lakeside Coal Co.'s mine in Sand Coulee, Mont., on May 20th, 1911. Several witnesses testified at Inquest but no one could give anything definite concerning the cause of death. Mr. Mike, as stated, was employed as driver in the mine, and on part of the run, it was necessary to sprag the trip, there being a small hill to come down—short but steep —when found the horse was unhitched from the trip and driver lying under the first car of the trip.

Verdict of the Coroner's Jury was: "That the said Theodore Mike came to his death in Lakeside Coal Co.'s mine at Sand Coulee, Cascade County, Montana, on May 20th, 1911, at 3 P. M., being found lying underneath a loaded car; there being no positive evidence offered as to how death was caused.

"We the Jury, do advise, that the entry, at the point of accident, be brushed down to a height of five and one-half feet, for the safety of other drivers."

On September 25th, 1911, John Hilmonen, a miner, was engaged in drawing a pillar in Nelson-Jenks Coal Co. mine, at Sand Coulee and the ground had caved behind him and slid pretty close up to the face, and while Hilmonen was engaged in moving some of the rock and loading the coal into a car that was lying under it, a large piece of roof rock slid down from near the roof and knocked out a prop that fell paralleling the track and between this and the track Hilmonen was lying and

the rock had slid clear over the prop and had Hilmonen pinned fast for a time.

Statements obtained from miners working in this mine and that had worked like places say that the custom was to set up some props solid and build pack walls up near the roof to protect from sliding.

Mr. Hilmonen was so seriously injured that he died a few weeks afterward while in the Hospital at Great Falls.

November 30th, 1910, an accident occurred in the No. 4 mine of the N. W. I. Co., Red Lodge, in which one man, Henry Lehto, miner was almost instantly killed and his partner, Alex Haapajoki was fatally injured and died in a few days thereafter.

Man trips are run in this mine to hoist the men out at quitting time and those two men with many others had gathered out near the slope waiting for time for man trip, but Haapajoki & Lehto ventured farther toward the slope than the other men and were seated on a little bench or seat at the nose of a crib on the 8th East entry, coal was yet being hoisted out of the slope, the car cutter hollered for the men to look out as he was going to run on the 8th East entry and the men started back to get out of the way of the trip, almost instantly a car broke loose from the trip on the slope and took the switch for 8th East entry but jumped the track and struck both Haapajoki and his partner Lehto, knocking one of them down the slope and the other in the 8th East entry and as a result both men lost their lives.

Notices were printed in three or four different languages, one of which was in Native tongue of Haapajoki and Lehto, Finlander, and posted on the parting and men were often threatened and some had been discharged for violating the warning given in Notice to keep back a certain distance from slope until main trip stopped and to go out in regular order to get on the trip; there is not question if orders which were very well known to all had been obeyed the accident would not have happened.

Simon Kapor a miner was almost instantly killed in the No. 4 mine of Northwestern Improvement Company by a fall of rock on March 13th, 1911, he and his partner were engaged at the time of the accident in running a car down the room and bringing an empty one up and Kapor was at the brake of McGinty and his partner riding the loaded car down.

The partner heard some noise and car stopped he went back up the room and found Kapor under the rock, but not dead yet. He testified that the Foreman, Mark Lantz, had ordered this piece of rock taken down, and said he and his partner tried to take it down but failed to do so and left it up thinking it would not fall.

Mark Lantz told them to take the rock down or take their tools out and within one hour from that time was notified that an accident had happened and that Simon Kapor had been killed.

The verdict of Coroner's Jury was: "That Simon Kapor came to his death through a fall of rock in room 152-5th east entry No. 4 slope and that he had been notified by the foreman, that the rock was dangerous and he neglected to take it down or secure it with timbers as he had been ordered to do by the foreman."

Dominick Nello and his partner were working as miners in room 21, 5th west, No. 2 vein, on September 12th, 1911, and the partner started to load a car of coal and Dominick Nello started to mine coal when a large pot of rock fell out of a pot hole killing him. From the testimony offered by Joe Tarro the partner of Nello, the roof had been inspected and Nello expressed the opinion that while it was loose it would not fall and he, as stated, was engaged in mining near the top taking out support of the roof loosed by the presence of this pot hole when it fell on him crushing out his life.

Coroner's Jury Verdict was: "That Dominick Nello came to his death by an unavoidable accident while in the employ of the Northwestern Improvement Company on the 12th day of September, 1911."

David Jones, a miner employed by the Bridger Coal & Improvement Company, at their mine in Bridger, was fatally injured, November 12th, 1910, by a moving loaded car of coal. In the portion of the mine where Mr. Jones was employed, the rooms were driven to the raise and the loaded car in one room attached to wire cable, pulled the empty car up the adjoining room. Being ready to drop the loaded car out of his room, and noticing the jacking of the cable—this was signal used to pull out block and let car down—and thinking the driver had hooked on an empty car to other end of cable in adjoining room, Jones pulled out block from in front of loaded car in his

room and with nothing on the other end of cable to balance the weight of load it must have moved rapidly.

Mr. Jones says: "He could not get out of the way of car and was trying to get ahead of it and when found at the bottom of room he was partially underneath the car and fatally injured. The jerking of the rope noticed by Mr. Jones was no doubt, caused by the driver stepping on rope to pull pin our of clevice and release load on the end of cable instead of hooking on an empty as Mr. Jones stated to his comrades he thought it was. Coroner's Jury Verdict was: "We, the jury, do find that David Jones came to his death on November 12th, 1910 (Saturday), in room twenty-two, seventh south, No. 1 mine of the B. C. & I. Co., Bridger Montana, by an accident in which we find that no one was to blame but himself."

On November 28th, 1911, Joseph Rumoid and his partner, James Minni, were engaged in pillar drawing in room 5, 2nd. South West in No. 2 mine at Klein, the property of the Republic Coal Co., when an accident occurred in which Joseph Rumoid lost his life.

A Coroner's Inquest was held and testimony offered by 12 different witnesses.

The partner of Rumoid, James Minni testified that Rumoid was undermining a piece of coal and that he, Minni, called the attention of his partner to this coal being loose and Rumoid said "No it's solid yet and he kept on mining until it fell on him crushing the life out of him.

Hirst Beever, the Face Foreman, had visited the pillar workings here the day before the accident and had cautioned Rumoid particularly regarding his working face. There was a stump of coal about 10 feet by 5 feet by 5.5 feet that Rumoid was working on and Beever warned him not to go too far under it without wedging down the loose pieces. Rumoid assured him he would wedge it down and said, "It will not catch me."

The Miners' Union had selected a committee to make an examination and investigation of place and accident and two of the committee testified that accident could have been averted if proper precautions had been taken by Rumoid.

From testimony offered there were plenty of timber available to set up for roof and sprag the coal and make it safe to work under.

In the judgment of the Inspector it was very careless in Rumoid, practically undermining this stump of coal without

spragging it to make himself safer. Negligence for which Rumoid forfeited his life.

Coroner's Jury Verdict was: "That Joseph Rumoid was accidentally killed by falling coal caused by his own carelessness on November 28th, 1911."

On June 3rd, 1912, Emmerson Bailey, motorman, was run over by motor and loaded car of coal and fatally injured and died before reaching the surface. D. Besson was nipper on the motor, and was the only eye witness to the unfortunate affair.

Besson testified they were coming out of the 1st West entry of the Roundup Coal Mining Co.'s mine A with a loaded trip of cars, Bailey and himself were riding on the motor and they were making a spurt of a run for a hill and Besson told Bailey there was something wrong with the motor; he said there was something hitting the ties. Bailey leaned over and was looking along side of the motor when it stopped suddenly and the jolt over-balanced Bailey and threw him off and in front of the motor and ran over him. Besson stopped the motor as soon as he could and noting the condition Bailey was in ran for help to get him out.

Being asked if any complains had been made of the motor or any of its equipment, Besson said: "That Bailey had complained of the brake, that he did not like it but said, that he, himself, while he had been with the motor for four days as nipper, he had not noticed anything of the construction of the motor or brake beam being out of order.

The motor brake beam which fits into hangers suspended perpendicular on the inside of the outside casing of motor, had a tit on either end that fitted into eye holes on hangers spoken of; from about the center of this beam a clevice was fastened and from this clevice was attached chain that wound around brake staff and caused the shoes of the brake to rub against the wheels, this to slacken speed or stop the motor. The brake beam was broken in two near or at the center where clevice was fastened.

Investigation and inquiry led me to believe that in some manner one end of this beam came out of eye hole as hanger struck on the track or ties along the road and that would be what caused the sudden jolt which threw Mr. Bailey from and in front of motor. On Saturday morning before the accident, the Electrician, Mr. Brown, testified he had ridden in with Bailey to the end of his run and out again with him and it was

working in good shape; no complaints about either motor or brake being made to him.

Coroner's Jury Verdict was: "That Emmerson Bailey's death was caused by being run over by mine motor and one car of coal, loaded.

"Said accident being caused by breaking of brake beam on motor. Said death occurred on June 3rd, 1912, at about 1:20 P. M., at Roundup Coal Co.'s Mine A."

A. J. Schrader, a miner was blasted with powder charged hole in Davis Coal Co.'s mine B, at Roundup, on December 12th, 1911.

The method of firing shots in this mine at this time was shooting when going off shift, the day shift would fire holes at about 3 P. M.

Schrader and his partner, Matt. Erickson, were pulling pillars, one on either side of the room they were in, and they had one shot each to fire on either side of the place and Erickson succeeded in spitting the fuse in the shot he was lighting and hollered "fire" and both he and his partner went down to the entry. Schrader told his partner "I did not light my shot, give me your knife and show me a light. Erickson wanted him to go out on top for half an hour and wait giving the shot time to go off if it was lighted. Schrader insisted on going up to light his shot, the shot was laid paralleling the pillar and on going up the place, Schrader was about 9 or 10 feet ahead of Erickson, and when opposite the shot which had been drilled about 8 feet deep and had about 4 feet of lift and about 3 feet of powder in it, it went off and coal flying from the blast struck Schrader, fatally injuring him. He lingered until December 14th and died.

Coroner's Jury Verdict was: "That A. J. Schrader came to his death caused by accidental happening at Davis Coal Co.'s mine, 1st East entrance room 15, by his own carelessness in going back on his shot in too short a time, said time being eight minutes from lighting fuse; accident occurring at 3:15 P. M. the 12th day of December, 1911, death resulting on December 14th, about 8 A. M.

Quotation of law with reference to lighting fuse: "When a fuse is used and a shot misses fire no person shall return until one hour for each foot of fuse shall have elapsed." With an 8 foot hole and 3 feet powder there would have been at least 5 or 5.5 feet of fuse and required as many hours for safety.

On Saturday Morning, May 11, 1912, a rather peculiar accident happened in the No. 1 mine of the Lochray Coal Company. It appears the mine was idle that day—not dumping coal, although some men were working in different portions of it doing repair work—but, Geo. Sutich, a miner who was working in No. 8 room 1st East entry, was told by the Superintendent, Charles Sederholm, to drive a cross cut, or rather finish it, into No. 9, the adjoining room to his, for the purpose of ventilation and drainage and so he was at work on May 11th, 1912.

Three other men, employees of the Lochray Coal Co., though not on duty at the time, were in their clean clothes and went into the mine, not to do any work but to have a look around the mine so they say.

They visited in both Nos. 1 and 2 mines and were in No. 9 room and two of the men—Mike Vuxfer and Milo Terovich or Perovich—were opposite the cross cut that Geo. Sutich was trying to hole through when a shot charged with powder flew through the pillar and seriously injured one and fatally injured the other, Milo Terovich dying shortly after going outside, unaided, he had been cut on the neck and windpipe with a sharp piece of rock or coal from the shot.

Arriving in Sand Coulee and learning that Coroner and Justice of the Peace had decided that inquest was unnecessary—though I do not know why they decided so, I took sworn statements from all whom I thought might be able to throw any light upon the case, and among others got statements from Geo. Sutich, the miner who fired the shot that killed Terovich; statements from Mike Vuxfer and Louis Starcovich, the two men who were prowling around the mine with Terovich, and statements from Charles Sederholm, superintendent of the mine, also from Otto Speck, book-keeper for the Lochray Coal Co., and Warren Wheeler, the barn boss.

Statement of Geo. Sutich is as follows: I am working in No. 8 room off 1st. East, No. 1 mine, and I went into the mine Saturday morning, May 11, to get cross cut broke through from No. 9 to No. 8 room, to drain the water out of No. 9 room and for ventilation. I went around to No. 8 room to drive the cross cut and made a shot in the cross cut out from No. 8 room. I drilled a hole in it Saturday; my partner was not with me. I drilled a hole about 5 feet deep and had about one and one-half feet of powder in it; I tamped the hole with needle and

I lit 4 different squibs and shot did not go off; I put a cap on about four and one-half feet of fuse and pushed it back into the needle hole; I lit the fuse and waited about 5 minutes and the shot did not go off. I was scared to go back in room, so I went up to No. 13 room, 2nd East, I thought the shot was not going to go off.

I went out of the mine about 3 o'clock and there was no one around the outside of the mine when I came out. I did not know the shot had gone off and injured Terovich and Vuxfer until I went home. Both men that were injured told me where they were at when they got hurt, then I knew it was the shot I had tried to fire, that had gone off.

I had been told by the boss to cut that cross cut through and shoot it down, for drainage and ventilation.

I did not know anyone else was working that day in the mine but me, had I known there was anyone else in the mine that day, besides myself, and my shot failed to go off I should have warned them to keep away from it. While I though it would not go off, I was afraid to go back on it, and I neither saw or heard anyone else in the mine that day and would have warned them had there been anyone around.

It was very careless in Sutich in lighting a shot and leaving it, even he thought it had missed. A sensible thing to do would be to fence off a place of that kind, if he did not want to stay and guard it.

Those three men had no business in the mine, in fact, were trespassing upon the Company's property, violating State Law, and Miners Union rules and regulations.

Charles Kananen, a shot lighter, employed by the Nelson Coal Co., in their mine at Sand Coulee, was found dead in the mine on April 28th, 1912. Charles Peterson, the mine foreman, while making the rounds of the mine on Sunday morning saw the body of Charles Kananen lying on his face and stomach in a cross cut of the 9th and 10th Butt off 10th South; by his side was lying the tamping bar and needle that he used while attending to his duties as shot lighter.

Kananen rode in with the driver from the outside of the mine to his work and the driver afterwards saw him in the mine about 10 o'clock, making up cartridges at 8th South 7th butt, about 24 room.

John Huseby, the night foreman, saw Kananen about 9:30 o'clock and said he was tamping a hole in 19 room 8th butt.

Andrew Biagi, machine runner, talked with Kananen at about 8:45 and Kananen told him he had lots to do. Again at 12:45 o'clock Kananen asked the machine runner for some oil, he gave him some machine oil; Kananen bid the machine runner, "good night," and went up the 9th Butt entry and fired 2 shots which the machine runner said he heard. The machine runner then went home and so far as we have been able to learn, it was the last time Charles Kananen was seen alive.

The superintendent, J. N. Pearce notified me of the accident and along with several others I went into the mine and made an examination of the place where body was found and of other places that he was supposed to have worked the night before.

The circumstances under which body was found and the appearance of the same led me to believe that carbonic Oxide poisoning was the cause of death, so I requested Dr. F. H. Thomas to take sample of the blood of Kananen and same was sent to Emil Starz, Helena, Mont., State Bacteriologist, who made me the following report as the results of tests.

" Spectroscopical of blood showed characteristic absorption bands of carbonic oxide haemeglobin. To confirm test the blood was treated with reducing substances such as ammonium sulphide and hydrogen sulphide water, but no change in the spectrum took place; Sodium hydrogen solution did not change Cherry red color of the blood. These reactions were compared with my own blood to show the different in behavior of oxy-haemeglobin and carbonic oxide haemeglobin toward reducing agents. From these reactions and tests I conclude Carbonic Oxide Poisoning.

While going around the mine looking for some clue and noting conditions—there were several men along with me—we noticed that in the 10th South entry, Main, five holes had been fired and coal broken down; place was foggy—powder fumes noticeable; coal shot back from the face fully 25 to 30 feet. Five holes had been drilled in a cross cut near the face, one hole had missed fire; there was a squib in the needle hole that had not burned up to the powder. I took the squib out of the hole and lit it and it burned up. Some one in the party found a small miner's lamp on top of the coal at this place.

I am of the opinion that in firing those nine holes some 80 or 90 feet ahead of the air current that Mr. Kananen would be considerably affected with nitrous fumes—carbon monoxide

—and from the appearance and distance the coal was thrown from the face, would indicate that powder had burned in the open air. I believe that Mr. Kananen went from this place to 9th and 10th butt and perhaps partially revived and again entering where there would be carbon monoxide present would be affected much more readily than upon entering a place of this kind at first. I will quote here extract from Technical Paper published by Bureau of Mines, the same was read at inquest. "If a man has breathed air containing carbon monoxide and has retired to fresh air to recuperate again enters workings containing this gas before the carbon monoxide has been entirely displaced from his blood, he feels the effects of this gas in less time than when he entered the workings before."

That the cause of death was Carbon monoxide Poisoning, I do not doubt. The method of shot firing was and is crude—one man alone should never be in a coal mine let alone being engaged in shot firing.

I believe that all those shots should be fired by battery, whether fired in rotation or simultaneously.

I believe it is just as essential to brattice current up from last c. c. to face in mines of this kind as it is where CH_4 is given off in small quantities—more so at times from small percentages of CO, the effect is much more sudden and effective.

It was suggested at the inquest that squibs should be dispensed with and fuse used in their stead. I do not believe in this method. If squib is used it's a cinch the hole is fully tamped; another good thing is it does not permit of firing so many at the same or practically the same time in the heated atmosphere—i. e.—bombarding.

It has been known to have explosions in coal mines in the absence of any amount of dust or CH_4—but from the gases as generated from powder in blasting.

Many mining men claim there would be no danger in firing those shots simultaneously, by battery, and that each shot is fired in its own fresh air and is less dangerous and that less powder would do much more effective work.

Would say that since the accident it is customary to send a man along with shooter while he is lighting the shots.

No battery has been installed to take the place of men in this mine nor mines of like character in this state, nor do we expect them to do so of their own motion.

Coroner's Jury Verdict, was: "That the said Charles Kananen being a shot firer in the Nelson Mines, came to his death in the last crosscut between the 9th and 10th South butt entries off the 10th South on morning of April 28th, 1912, according to the evidence obtained that said Charles Kananen came to his death through Carbon monoxide Poisoning or what is commonly known as White Damp.

"We, your jury, therefore, do recommend that two shot firers work together in future while firing shots."

Isaac Mattson, a miner, was fatally injured by falling roof in the Carbon Coal Co.'s mine, Sand Coulee, November 18th, 1911, in room 2, 3rd butt entry and died as a result of his injuries a few days later.

The partner of Mattson's testified at Coroner's Inquest that they both realized the dangerous condition of the roof they were working under and thought of setting a prop under it, but, knowing the blast would in all probability, knock it out, they concluded to pull down all of the loose rock they could, they did so, Hutanen was on his knees about a couple of feet away from Mattson who was standing upright and heard the rock crackling and made a jump out of the way, but Mattson was caught under it and fatally injured.

The coal is between 7 and 8 feet thick with a draw slate from 6 inches to 18 inches coming down right along, no attempt is made to timber this up.

The partner testified that he knew nothing that the Company could have done that was not done to have made the place safer. He said that he had worked in the Sand Coulee field for six years and was familiar with the roof there. There was timber on hand that could have been used if it was desired. Coroner's Jury Verdict was: "That said Isaac Mattson met his death in said mine by an unavoidable accident by a fall of slate."

Topani Poykka and his partner, Isaac Kiska, were engaged in Pillar drawing in No. 4 mine of N. W. I. Co., and on November 21st, 1911, while so engaged, falling roof, killed Topani Poykka.

From the testimony offered by Mark Lantz, foreman, and one other witness, not a sufficient amount of timber had been set up to keep the place safe; but, after an examination of the place and noting conditions therein, the piece of roof that fell

and killed Poykka, I saw that it tapered to feather edge on both sides of same and that a foreign matter or rock was between the regular roof and coal and above this and next to regular roof was a kidney of coal—small streak—this drifted matter ran diagonally across the place, the nature, generally of such intrusions are dangerous and require extra-precaution and timbering.

It may sound solid and in five minutes be down without any warning.

The Coroner's Jury Verdict, was: "That Tapani Poykka, came to his death, on the 21st day of November, 1911, while in the employ of the Northwestern Improvement Company, in room 156, 6th East entry, No. 4 vein, by a fall of rock from the roof.

"We, the jury, find, that Tapani Poykka came to his death by accident."

Dominick Varisco and partner were working in room 40, 6th East, No. 2 vein of the N. W. I. Co., at Red Lodge, Carbon County, on June 19th, and Dominick Varisco was killed by a fall of rock.

There is from one foot to three feet of a soapy, slaty, top over the coal that is practically impossible to hold and while sometimes it is advisable to put up a temporary post under it to enable the men to load coal, yet no effort is made to timber this roof up permanently.

Dominick and his partner had talked of the advisability of putting up a post temporarily under a loose piece of this roof they had been trying to take down, trying to wedge it and failing to get it down, Dominick said to his partner while they were eating their lunch we had better put up a prop under this rock right away, but they finally concluded they would load another car first; another car was loaded and Dominick was throwing out some loose coal from under where this rock fell and his partner said: come on with me to the face and help mea nd get away from there, that rock may fall, but Dominick said he would throw out a couple of chunks of coal first and in stooping to get hold of a piece of coal was struck by falling roof and killed.

Coroner's Jury Verdict, was: "That Dominick Varisco came to his death on June 19th, 1912, in room 40, 6th East entry, No. 2 vein of the N. W. I. Co., mine at Red Lodge, Montana. That the said Dominick Varisco came to his death through the negligence of himself and his partner."

Herman Hahto was killed in room 17, 4th West, No. 2 Vein in the Sunset Mine of the N. W. I. Co., by coal sluffing off the rib and falling on him.

It appears that Herman and his partner had about finished work for the day and were going to set a couple of props and Herman was digging a foot-hole for a prop when a piece of coal and slate fell off the side of the rib, killing him instantly.

The coal in this room to the roof coal was about eight feet thick; when shooting this coal from the rib, for about 2 feet below the roof coal, coal and dirt mixed, struck to the roof, rounded off, the bottom would be shot out all right, but it stuck against the roof coal and as there would be very little good coal in it, sometimes it was left alone, until it fell itself. The room was kept well timbered and in fine shape otherwise. The partner of the man killed, testified that neither he or his partner sounded or paid any attention to that part of the room that day.

Coroner's Jury Verdict, was: "That Herman Hahto, came to his death on the 7th day of September, 1912, in the Sunset mine of the N. W. I. Co., in the No. 2 vein, 4th West entry, room 17, by a fall of coal and rock from the right rib of said vein, and that his death was accidental and caused from his own neglect in so far as the said Herman Hahto did not examine nor properly inspect his room before going to work on the above date.

John Pfrognar, a machine runner, had the life crushed out of him in the Smokeless and Sootless Coal Co.'s mine, in Bear-creek, on November 20th, 1911, by a runaway trip.

It appears that a small electric hoist is stationed at the top of one of the dip entries and there is quite a knuckle at the top to give the cars a start and while the machine that Pfrognar was running propels itself around the mine on ordinary grades it was not able to climb over this knuckle and so, Pfrogner and his partner were waiting to have the rope runner hitch onto the machine and pull it over the knuckle and, evidently, had run the machine part way out on the room switch; the rope runner when going over the knuckle at the top with three cars, cut off the rope before the cars were over the knuckle and while there was a drag on behind the cars it proved inefficient and cars ran down the grade, smashed into machine and crushed the life out of John Pfrognar.

The drag or dog was three foot, three inches in length; made out of one-half inch by three inch iron; one end of this for about 18 or 20 inches was re-inforced by same material with

3 rivets through it; there was about seven inches spread in prongs at the point.

The foreman testified that the grade from top of knuckle outside was about 1%; and from top to foot of knuckle about fifteen degrees; and there was about 3 or 4 feet fill at the top and his opinion was that drag stuck into a tie and lifted car up and drag doubled back and cars came back down on rail and runaway down the slope.

We are of the opinion that drag was altogether too light for the load. We are of the opinion that Pfrognar and partner ventured too far out on the entry and should have stayed inside the switch until the return of rope rider to pull him up as agreed upon.

With latches set for the straight road, the chances are, that trip would have passed them, but with machine out on the road, there was little chance to escape an accident for the distance from knuckle to where they were struck was one hundred and seventeen feet and stiff grade would not have given much time to get out of the way.

We are also of the opinion that it was gross carelessness on the part of rope rider in cutting off the cars until he knew positively they were over the knuckle. Coroner's Jury Verdict, was: "John Pfrognar came to his death by being struck with runaway trip and we further find that it was by his own carelessnes in not obeying orders."

Those probable dangers spoken of and the accident lists and tables are what suggests our recommendations for a revision and bracing up and adoption of some new mining laws. The accidents for 1912 period were less than for 1911 period and there were also less number of men and boys employed in and around the coal mines for the same period. There were 3,776 reported employed in 1911; there were 50 fatal and 13 fatal accidents in 1911 period; 3.44% per thousand employed, killed; 13.3% per thousand employed, seriously injured.

In 1912 period there were reported 3,598 men and boys employed in and around the coal mines in Montana; 188 less than in 1911 period; there were 10 fatal and 47 non-fatal accidents; 2.783% per thousand employed, killed; 13.36% per thousand employed, seriously injured; in 1911 period, for each fatal accident there was 224,107 tons of coal produced; in 1912 there was 314,380 tons produced for each fatal accident and 66,889

tons for each serious accident as against 58,268 in 1911 period.

In 1909 and 1910 periods together, there was produced for each life lost, 190,066 tons of coal; there was 47,930 tons of coal produced for each non-fatal accident in Montana Coal mines, there were 3.76% per thousand employed, (3.827+4,117) killed; and 14.4% per thousand employed, seriously injured.

In 1911 and 1912 periods together there was produced 6,057,-186 tons of coal from our Montana coal mines; this beats all former records for a like period by 545,261 tons.

There was reported in 1911 and 1912 7,374 men and boys employed as against 7,979 in 1909 and 1910 or 605 less number of employees for the two years. The rate per thousand employed killed is less for 1911 and 1912 and is 3.12% for fatal and 13.2% for non-fatal or 1.2% less, for the non-fatal and .64% less for the fatal accidents.

OCCUPATIONS OF PERSONS KILLED IN AND AROUND THE COAL MINES IN MONTANA FROM OCTOBER 31, 1910 TO OCTOBER 31, 1911.

Occupation.	Killed.	Injured.	Total.
Pick miners	12	31	43
Drivers	1	9	10
Laborers	..	1	1
Machine helper	..	1	1
Shot Firer	..	1	1
Bratticemen	..	1	1
Motorman	..	1	1
Machinist	..	2	2
Fireman	..	1	1
Car Dropper	..	1	1
Top Boss	..	1	1
Total	13	50	63

CAUSE OF INJURIES TO PERSONS IN AND AROUND COAL MINES.

Cause.	Killed.	Injured.	Total.
Falling Roof	6	11	17
Falling Coal	2	12	14
Moving Cars	5	15	20
Falling off Tipple	..	1	1
Scaffold Beaking	..	1	1
Machinery	..	1	1
Powder blasted and burned	..	5	5
Falling Down	..	2	2
Kicked by Mule	..	1	1
Saw Mill	..	1	1
Total	13	50	63

AGES OF THOSE KILLED AND INJURED IN AND AROUND THE COAL MINES—1911.

Age.	Killed.	Injured.	
Twenty	..	1	
Twenty-one	1	1	
Twenty-two	..	1	
Twenty-three	..	1	
Twenty-five	1	1	
Twenty-six	2	5	
Twenty-seven	1	1	
Twenty-eight	..	10	
Twenty-nine	..	2	
Thirty	1	1	
Thirty-one	1	2	
Thirty-two	1	..	
Thirty-three	..	3	
Thirty-four	..	5	
Thirty-five	1	2	
Thirty-six	..	2	
Thirty-eight	1	..	
Thirty-nine	..	1	
Forty	..	1	
Forty-one	..	2	
Forty-two	1	1	
Forty-three	1	3	
Fifty	1	1	
Not Reported	..	3	
Total	13	50	
Total killed and injured			63

Of the thirteen persons killed in and around the coal mines, seven were married and fathers of fourteen children, six single men.

Of the fifty injured in and around the coal mines, 21 were married and fathers of 49 children, 29 were single men.

NATIONALITY OF THOSE KILLED AND INJURED IN AND AROUND THE COAL MINES—1911 PERIOD.

Nationality.	Killed.	Injured.	Total.
Bulgarian	1	..	1
Finlander	4	11	15
Italian	1	9	10
Romanian	1	1	1
Creotian	..	1	1
American	1	6	7
Irish American	..	2	2
Slavonian	..	4	4
Austrian	2	7	9
Servian	1	1	2
Welshman	1	..	1
Russian Polish	..	1	1
German	..	1	1
Sweede	..	3	3
Montenegrin	..	1	1
Austrian Polish	1	..	1
Englishman	1	..	1
Scotchman	..	2	2
Lithuanian	..	1	1
Total	13	50	63

OCCUPATIONS OF THOSE KILLED AND INJURED IN AND AROUND THE COAL MINES IN MONTANA, FROM OCTOBER 31, 1911, TO OCTOBER 31, 1912.

Occupation.	Killed.	Injured.	Total.
Pick Miners	7	24	31
Drivers	..	4	4
Machinemen	1	4	5
Shot-firer	1	..	1
Gasoline Motorman	..	1	1
Electric Motorman	1	5	6
Top-boss	..	1	1
Inside-boss	..	1	1
Engineer	..	1	1
Loader	..	2	2
Car Coupler	..	1	1
Timbermen	..	2	2
Trackmen	..	1	1
Total	10	47	57

CAUSES OF ACCIDENTS IN AND AROUND THE COAL MINES IN MONTANA FROM OCTOBER 31, 1911, TO OCTOBER 31, 1912.

Cause.	Killed.	Injured.	Total.
Falling roof	3	15	18
Falling coal	2	6	8
Moving cars	1	7	8
Machinery	..	1	1
Powder blasted and burned	2	4	6
Gasoline Motor	..	1	1
Electric Motor	1	5	6
Gas explosion	..	1	1
Miner's pick	..	1	1
Elevator	..	1	1
Rolling timber	..	1	1
Mining machines	..	4	4
Carbon monoxide poisoning	1	..	1
Total	10	47	57

AGES OF THOSE KILLED AND INJURED IN AND AROUND THE COAL MINES IN MONTANA—1912 PERIOD.

Age.	Killed.	Injured.	Total.
Seventeen	..	1	1
Twenty-one	..	5	5
Twenty-two	..	1	1
Twenty-three	..	2	2
Twenty-four	..	3	3
Twenty-five	1	7	8
Twenty-six	..	2	2
Twenty-seven	..	2	2
Twenty-eight	1	3	4
Twenty-nine	3	3	6
Thirty	1	1	2
Thirty-one	..	2	2
Thirty-two	..	2	2
Thirty-three	..	2	2
Thirty-five	..	1	1
Thirty-six	..	1	1
Thirty-seven	..	2	2
Thirty-nine	1	..	1
Forty	..	3	3
Forty-two	1	..	1

Fifty	1	1	2
Fifty-two	1	..	1
Fifty-five	..	1	1
Age not given	..	2	2
Total	10	47	57

Of the ten persons killed in and around the coal mines, four were married men and fathers of nine children, six were single men.

Of the forty-seven injured in and around the coal mines, seventeen were married men and fathers of thirty-two children; twenty-seven were single men; three not reported whether married or single.

NATIONALITY OF THOSE KILLED AND INJURED IN AND AROUND THE COAL MINES, FROM OCTOBER 31, 1911, TO OCTOBER 31, 1912.

Nationality.	Killed.	Injured.	Total.
Finlander	4	4	8
Italian	2	8	10
American	2	12	14
Slavonian	..	1	1
Austrian	1	12	13
Servian	..	1	1
Montenegrin	..	3	3
Englishman	..	4	4
Scotchman	..	2	2
Bohemian	1	..	1
Total	10	47	57

In 1911 period, from October 31st, 1910, to October 31st, 1911, nearly 62% of the fatal accidents in and around the coal mines in Montana were caused by falling roof and coal.

Moving cars, was the cause of 38% of Fatal accidents.

49.2% of the whole number of accidents—63—were from falling roof and coal; 31.7% from moving cars; 7.9% from powder blasted and burned; and a little over 11% from all other causes.

1912 Period.

50% of the accidents in this period were caused by falling roof and falling coal. (Fatal).

Moving cars and motor was the cause of 20% of the fatal accidents; powder blasted was the cause of 20%; carbon monoxide poisioning 10%.

45.6% of the whole number of accidents—57—were from falling roof and falling coal; 26.3% from moving cars and motors; 8.5% powder blasted; 8.5% from mining machines; and 11% from all other causes.

During the 1911 period there were 3 fatal accidents in November, 1910
" " " " " " 3 " " " December, 1910.
" " " " " " 1 " " " January, 1911.
" " " " " " 2 " " " March, 1911.
" " " " " " 1 " " " April, 1911.
" " " " " " 1 " " " May, 1911.
" " " " " " 2 " " " September, 1911.

During the 1912 period there were 4 fatal accidents in November, 1911.
" " " " " " 1 " " " December, 1911.
" " " " " " 1 " " " April, 1912.
" " " " " " 0 " " " May, 1912.
" " " " " " 3 " " " June, 1912.
" " " " " " 1 " " " September, 1912.

Summary of Recommendations.

Shot Firers law: Tamping to be put at mouth of working place by the company.

All fine coal and machine cuttings to be loaded out before firing of shots would be permitted.

A law strictly prohibiting more than 25 lbs. of powder being kept in the mine any one place or box.

To prohibit Powder magazines or inflammable buildings to be placed between escapes in the mine as well as on the surface.

All stoppings on either Main or cross entries to be made of brick, blocks, masonry or concrete or non-perishable material.

Examination of miner, of superintendent, of manager or operator having anything to do with operation of mines.

Two grades of Certificate for mine foreman; one kind of Certificate for fire boss examination:

Law to specify the number of men that could be employed in a mine before Certificated Foreman should be required.

When examination of airways and travel ways was made, weekly, notices of condition be made in triplicate, one copy sent to inspector, one posted at the mouth of mine, and one kept in mine office: date and initials to be made in places examined. To be signed by foreman and superintendent.

To empower examining boards, with right and duty to revoke certificates for cause, drunkeness, or inattention to duty.

Law to require fan or furnace and if furnace, to define equipment, and that some mechanical means for ventilation be compulsory when five or more men are employed.

All overcoats to be made of incombustible material or driven in solid strata.

Where haulageway becomes muddy and wet from any cause and same is used as travelway, to compel man trips night and morning to haul men to and from work.

Cut out all shooting during the working hours when men are in the mine.

At least two entries must be driven parallel and breakthroughs must be made every 60 feet.

Escapes to adjoining entries every 1,500 to 2,000 feet or

have refuge rooms with borholes to surface and refuge rooms properly equipped with iron doors and provisioned and communication facilities installed between refuge room and surface.

When member of Board of examiners for State Coal Mine Inspector changes occupation, ineligible for membership. Definition of miner, of manager, of superintendent and of mining engineer.

Snubbing shots defined.

Penalty clause to oil inspection, sale, etc.

Installation of scales at mines employing 10 men.

Cut out notification by inspector of an intended examination of mine.

Compensation Law advocated same as Washington.

Another subject should be taken up and regulations prescribed therefor: Gasoline haulage motors and pumps in coal mines.

Increased uses for electricity in coal mines has been the subject of legislation for its installation and maintenance.

It would be easier and work less hardship upon operating companies to have good regulations adopted into law before general installation of motors electric and gasoline, or prohibit their use, as seems best.

SUMMARY.

Comparison of Two Periods—1911 and 1912.

Total number of mines reporting production; 45 in 1911—48 in 1912.

Total number of machinemen employed; 220 in 1911—181 in 1912.

Total number of loaders employed; 435 in 1911—563 in 1912.

Total number of miners employed; 1,715 in 1911—1,538 in 1912.

Total number inside daymen employed; 764 in 1911—746 in 1912.

Total outside daymen employed: 642 in 1911—570 in 1912.

Average production per man per day employed; 3.3 in 1911—4.3 in 1912.

Total tonnage produced in 1911 period; 2,913,406 tons.

Total tonnage produced in 1912 period; 3,143,799 tons.

Total value of production in 1911 period; selling price at mine $4,904,620.83.

Total value of production in 1912 period; selling price at mine $5,600,097.

In 1911 there were 224,108 tons produced for each life lost.

In 1912 there were 314,380 tons produced for each life lost.

In 1911 there were 58,268 tons produced for each serious accident.

In 1912 there were 66,889 tons produced for each serious accident.

In 1911 out of every 290 men employed there was one life lost.

In 1912 out of every 360 men employed there was one life lost.

In 1911 there was one serious accident for every 76 men employed.

In 1912 there was one serious accident for every 76 men employed.

Percentage, per thousand employed, killed in 1911, was 3.44%.

Percentage, per thousand employed, killed in 1912, was 2.78%.

Percentage injured, per thousand employed in 1911, was 13+%.

Percentage injured, per thousand employed in 1912, was 13+%.

There was used to break down the coal in 1911 period:

Black blasting powder, 1,808,745 pounds.

Dynamite, 35,220 pounds.

In 1912—Black blasting powder, 1,818,500 pounds.

In 1912—Dynamite, 25,331 pounds.

In 1911 period, hand mined and shot off the solid, 1,847,317 tons.

In 1912 period, hand mined and shot off the solid, 2,069,540 tons.

Machine mined, in 1911 period, 36.6%—1,066,088 tons.

Machine mined, in 1912 period, 34%—1,074,258.6 tons.

Accidents in and Around Coal Mines in Montana From October 31, 1910, to October 31, 1911 (1911 Period)

County.	Date.	Name of Company.	Locality.	Name of Person Injured.	Age	Nationality.	Occupation.	Injured	Killed	Married	Single	No. of Children.	Cause of Accident, Extent of Injury.
Carbon	Nov. 4, 1910	Northwestern Improvement Co.	Red Lodge	Isaac Koskela	33	Finlander	Miner	Injured			Single		Moving car; bruised hips and back.
Carbon	Nov. 7, 1910	Northwestern Improvement Co.	Red Lodge	Stony Banich	43	Russian Polish	Miner	Injured		Married		Six	Fell off rail road; side bruised, rib fractured.
Carbon	Nov. 9, 1910	Northwestern Improvement Co.	Red Lodge	Frank King	34	German	Miner	Injured		Married			Moving car; broken leg.
Carbon	Nov. 12, 1910	Bridger Coal and Improvement Co.	Bridger	Charles Hendrickson	29	Finlander	Miner	Injured			Single		Moving car; hand caught on top of loaded car and roof; middle finger right hand cut off at first joint.
Carbon	Nov. 12, 1910	Bridger Coal and Improvement Co.	Bridger	David Jones	32	Welshman	Miner		Killed	Married		Two	Moving car; killed. (Fatally injured, died).
Carbon	Nov. 30, 1910	Northwestern Improvement Co.	Red Lodge	Alex Haagpajoki	30	Finlander	Miner		Killed	Married			Moving car, runaway on slope. (Fatally injured, died).
Carbon	Nov. 30, 1910	Northwestern Improvement Co.	Red Lodge	Henry Lekto	31	Finlander	Miner		Killed	Married		One	Moving car, runaway on slope. Killed.
Carbon	Feb. 13, 1911	Northwestern Improvement Co.	Red Lodge	Felix Forsman	28	Finlander	Miner	Injured					Falling roof; leg broke.
Carbon	Mar. 7, 1911	Northwestern Improvement Co.	Red Lodge	Alex Kivi	23	Finlander	Miner	Injured			Single		Falling roof; leg broken. (Write Carbon County hospital for particulars).
Carbon	Mar. 7, 1911	Northwestern Improvement Co.	Red Lodge	John Tunkua	30	Finlander	Miner	Injured			Single		Falling roof. (Extent of injury not given write Soudders).
Carbon	Mar. 13, 1911	Northwestern Improvement Co.	Red Lodge	Simon Kapor	35	Servian	Miner		Killed	Married		a Two	Falling roof; killed almost instantly.
Carbon	Feb. 28, 1911	Smokeless and Sootless Coal Co.	Bear Creek	Charles Pulich	26	Austrian	Miner	Injured			Single		Falling roof; index finger and middle finger right hand mashed; skin and flesh badly torn, skin bruise on back of hand.
Carbon	Mar. 27, 1911	Northwestern Improvement Co.	Red Lodge	Peter Berta	25	Italian	Miner	Injured			Single		Falling Coal; right leg broken.
Carbon	May 22, 1911	Northwestern Improvement Co.	Red Lodge	Jaylo Kainu (Yalo Klimo)	40	Finlander	Miner	Injured		Married		Five	Falling Roof, broken leg.
Carbon	May 24, 1911	Northwestern Improvement Co.	Red Lodge	John P. Davis	34	Swede	Bratticeman	Injured		Married		b One	Falling coal, sluffing from rib.(Slight skin abrasions and decided indentations of spinal column over lower dorsal and uper lumbar vertebrae, for about 4.5" resulting in paralyses and anesthesia of both limbs).
Carbon	June 5, 1911	Northwestern Improvement Co.	Red Lodge	Oscar Jackola	..	Finlander	Miner	Injured			Single	c Four	Falling coal; left leg broken, between knee and ankle.
Carbon	July 12, 1911	Northwestern Improvement Co.	Red Lodge	Oscar Kallia	..	.....	Miner	Injured		Married		One	Falling coal; left leg broken below knee, nose broken, face bruised.
Carbon	Sept. 7, 1911	Bituminous Coal Co.	Coalville	John Kolar	41	Slavonian	Driver	Injured		Married		Five	Moving car; shoulder bruised and skin slightly cut.
Carbon	Sept. 8, 1911	Northwestern Improvement Co.	Red Lodge	Joe Mataja	50	Austrian	Miner	Injured		Married		d Three	Moving car, McGinty; fracture of right leg, both bones middle third between knee and ankle abrasion around left knee.
Carbon	Sept. 12, 1911	Northwestern Improvement Co.	Red Lodge	Dominick Nelo	38	Italian	Miner		Killed	Married		e Three	Falling roof; (pot hole). Killed.
Carbon	Sept. 13, 1911	Northwestern Improvement Co.	Red Lodge	Andrew Walker	20	American	Motorman	Injured			Single		Burned with powder; face, neck and hands burned, 1st and 2nd degree.
Carbon	Sept. 15, 1911	Montana Coal and Iron Co.	Bear Creek	Louis Jacanovich	23	Servian	Miner	Injured			Single		Falling coal. (Extent, see S. M. Soudders).
Carbon	Sept. 29, 1911	Northwestern Improvement Co.	Red Lodge	Wm. Manula	28	Finlander	Miner	Injured			Single		Falling bone and roof; broken leg (compound).
Carbon	Sept. 29, 1911	Smokeless and Sootless Coal Co.	Bear Creek	Joe Bosone	28	Italian	Driver	Injured			Single		Kicked by mule; bruised and shock.
Carbon	Oct. 4, 1911	Smokeless and Sootless Coal Co.	Bear Creek	Nick Golubovich	21	Montenegrin	Driver	Injured			Single		Moving cars; 1 rib broken, bruised hip, back bruised.
Carbon	Oct. 6, 1911	Bear Creek Coal Co.	Bear Creek	John W. Brimmer	26	American	Machinist	Injured		Married		f Two	Saw mill; lost index and large finger and part of hand.
Carbon	Sept. 25, 1911	Northwestern Improvement Co.	Red Lodge	Anton Vola	34	Italian	Miner	Injured		Married		g Wife	Falling coal; 2 ribs broken, back injured. (Write Dr. S. M. Soudders).
Carbon	Oct. 9, 1911	Northwestern Improvement Co.	Red Lodge	Eric Waltos	..	Finlander	Miner	Injured		Married			Falling roof. (Extent not given).
Carbon	Oct. 18, 1911	Northwestern Improvement Co.	Red Lodge	Radi Kovatovich	33	Montenegrin	Miner	Injured		Married		h Three	Falling coal; leg broken, head cut and bruised.

Accidents in and Around Coal Mines in Montana (1911 Period)—Continued

County.	Date.	Name of Company.	Locality.	Name of Person Injured.	Age	Nationality.	Occupation.	Injured	Killed	Married	Single	No. of Children.	Cause of Accident Extent of Injury.
Musselshell	Dec. 16, 1910	Republic Coal Co.	Klein	Dan Davis	28	American	Fireman	Injured			Single		Scaffold breaking, sprained ankle, right.
Musselshell	Dec. 16, 1910	Republic Coal Co.	Klein	Clarence S. Fox	28	American	Machinist	Injured			Single		Machinery; back sprained, hip bruised, left thumb dislocated, eyes swollen, slight internal injury.
Musselshell	Dec. 1, 1910	Republic Coal Co.	Klein	John Costello	36	Italian	Miner	Injured		Married		Seven	Falling coal; scalp torn, 3 ribs broken, slight internal injuries, bruised head, arms and chest.
Musselshell	Mar. 4, 1911	Republic Coal Co.	Klein	Wm. Lishman	25	Englishman	Miner		Killed	Married		One	Falling roof; fatally injured; died within one hour after accident.
Musselshell	April 4, 1911	Republic Coal Co.	Kleln	Samuel Brandon	28	Scotchman	Miner	Injured		Married		Three	Powder blasted; slight cuts from coal on face and hands.
Musselshell	April 28, 1911	Republic Coal Co.	Klein	David Dow	28	Scotchman	Driver	Injured		Married		Two	Moving car; lower part of right side squeezed, lower right limb rubbed.
Musselshell	April 28, 1911	Republic Coal Co.	Klein	George Garolonas	26	Lithuanian	Miner	Injured			Single		Falling coal; bruised between left knee and ankle.
Musselshell	June 14, 1911	Republic Coal Co.	Klein	Hugh O'Hara	31	Irish-American	Sub. Driver	Injured			Single		Moving cars; left foot below ankle badly squeezed; no bones broken.
Musselshell	Dec. 19, 1910	Roundup Coal Mining Co.	Roundup	John Olsen	28	Swede	Extra Driver	Injured			Single	i	Falling roof; fracture of spine.
Musselshell	Jan. 2, 1911	Roundup Coal Mining Co.	Roundup	John Hille	26	Finlander	Miner		Killed		Single		Falling roof; killed.
Musselshell	Jan. 19, 1911	Roundup Coal Mining Co.	Roundup	Albert Stockman	27	American	Miner		Killed		Single		Falling coal; fatally injured Jan. 19. Died Feb. 6th, 1911.
Musselshell	Sept. 12, 1911	Roundup Coal Mining Co.	Roundup	John Tomka	42	Austrian	Car Dropper	Injured			Single		Fell off tipple; fracture left clavicle.
Musselshell	Sept. 23, 1911	Roundup Coal Mining Co.	Roundup	Pete Nelson	33	Swede	Top Boss	Injured		Married		Three	Moving cars; contusion left hip and right arm; 2nd toe left foot dislocated.
Musselshell	Apr. 25, 1911	Davis Coal Co.	Roundup	John Aimon	39	Italian	Miner	Injured			Single		McGinty, moving car; hand caught and finger crushed necessitating amputation.
Musselshell	May 30, 1911	Davis Coal Co.	Roundup	John Sarkori	25	Italian	Miner	Injured			Single		Powder blasted; back of right lacerated, powder burned on hand.
Musselshell	June 16, 1911	Roundup Coal Mining Co.	Roundup	Matt. Kocel	43	Austrian	Miner	Injured			Single		Falling coal; compound communited fracture tibia and fibula left leg.
Fergus	April 15, 1911	Sam Schultz Mine	Sage Creek	John Miskan	..	Aus.-Polish	Miner		Killed	Married		Six	Falling coal; fatally injured April 11. Died April 15, 1911.
Park	Nov. 21, 1910	Maxey Brothers	Chimney Rock	George Wiehner	29	Austrian	Miner	Injured			Single		Falling coal; cut on face and head.
Park	Dec. 17, 1910	Maxey Brothers	Chimney Rock	Joe. Kranz	26	Austrian	Miner		Killed		Single		Runaway on slope; killed.
Park	Dec. 30, 1910	Maxey Brothers	Chimney Rock	Antone Prosnek	43	Austrian	Miner		Killed		Single		Falling coal; killed.
Cascade	Jan. 7, 1911	Nelson-Jinks Coal Co.	Sand Coulee	John Senkovich	31	Creotian	Miner	Injured		Married		Two	Falling roof; broken collar bone.
Cascade	Nov. 11, 1910	Nelson-Jinks Coal Co.	Sand Coulee	George Teppese	26	Italian	Laborer	Injured			Single		Falling roof and coal; broken leg.
Cascade	Nov. 27, 1910	Nelson-Jinks Coal Co.	Sand Coulee	Wm. Angle	22	Romanian	Driver	Injured			Single		Moving car; broken finger.
Cascade	Feb. 23, 1911	Nelson-Jinks Coal Co.	Sand Coulee	Mike Bussio	35	Italian	Miner	Injured			Single		Falling roof; cut on finger and hand.
Cascade	April 28, 1911	Nelson-Jinks Coal Co.	Sand Coulee	Nels Ferry	34	American	Driver	Injured		Married			Moving car; wrist cut; hand hurt.
Cascade	Aug. 31, 1911	Nelson-Jinks Coal Co.	Sand Coulee	Sam Kirki	27	Finlander	Machine helper	Injured			Single		Falling coal; broken collar bone.
Cascade	Sept. 25, 1911	Nelson-Jinks Coal Co.	Sand Coulee	John Hilmonen	42	Finlander	Miner		Killed		Single		Falling and sliding rock; fatally injured, died.
Cascade	Sept. 26, 1911	Nelson-Jinks Coal Co.	Sand Coulee	Dan Jones	34	American	Miner	Injured			Single		Falling off chunk of coal; bone in foot broken.
Cascade	Sept. 18, 1911	Calone and Johnson Coal Co.	Belt	John Markus	36	Slavonian	Miner	Injured			Single		Moving car; one finger mashed to bone of another necessitating amputation.
Cascade	Oct. 18, 1911	James Brodie and Son	Belt	Frank Piscar	26	Austrian	Miner	Injured		Married		Three	Powder blasted; fracture of skull, contusion of brain.
Cascade	Feb. 23, 1911	Cottonwood Coal Co.	Stockett	Paddy Leydon	43	Irish-American	Driver	Injured			Single		Moving car; broken leg.
Cascade	June 29, 1911	Cottonwood Coal Co.	Stockett	Andrew Bubnash	28	Slavonian	Shot-firer	Injured		Married			Falling roof; left shoulder bruised, cut on left leg.
Cascade	May 20, 1911	Lakeside Coal Co.	Sand Coulee	Theodore Mike	21	Bulgarian	Driver		Killed		Single		Moving cars; killed.
Cascade	June 23, 1911	Lochray Coal Co.	Sand Coulee	Peter Brelensky	28	Slavonian	Miner	Injured		Married		Two	Powder blasted; one eye put out, the other injured.

i—Permanently injured.

Accidents From October 31, 1911, to October 31, 1912 (1912 Period)

County.	Date.	Name of Company.	Locality.	Name of Person Injured.	Age	Nationality.	Occupation.	Injured	Killed	Married	Single	No. of Children.	Cause of Accident; Extent of Injury.
Cascade	Nov. 18, 1911	Carbon Coal Company	Sand Coulee	Isaac Mattson	50	Finlander	Miner	Injured	Killed	Married		Five	Falling roof; fatally injured, died.
Cascade	Nov. 28, 1911	Cottonwood Coal Co.	Stockett	Paul Tartar	22	Austrian	Loader				Single		Falling roof; upper jaw broken.
Cascade	April 11, 1911	Lochray Coal Co.	Sand Coulee	Louis Manovich	24	Servian	Miner	Injured		Married		One	Severe contusion left hip and back; falling roof.
Cascade	April 28, 1911	Nelson Coal Co.	Sand Coulee	Charles Kanenen	28	Finlander	Shot lighter		Killed	Married		Two	Carbon monoxide poisoning; found dead in mine by foreman, Charles Peterson. (Mine not working. Perovich with two other men were going through the L. C. Co.'s Mine, the —man working lit a shot and left it— he was working in No. 8 1st East, the men were in No. 9 room same entry, when shot that George Sutich tried to fire and supposed missed, went off.)
Cascade	May 11, 1912	Lochray Coal Co.	Tracy—S. Coulee.	Mike Tervich	52	Austrian	Miner		Killed	Married		One	Shot blowed through cross cut from one room to another. Fatally injured, died.
Cascade	May 11, 1912	Lochray Coal Co.	Tracy—S. Coulee.	Mike Vuxfer	23	Austrian	Miner	Injured			Single		Same accident or cause as above; bruised arm, face scratched and cut, head cut.
Cascade	Aug. 27, 1912	Nelson Coal Co.	Sand Coulee	Paul Hakala	25	Finlander	Miner	Injured			Single		Falling roof; cut on instep and toes of right foot. Probably necessitating amputation.
Carbon	Nov. 2, 1911	Bituminous Coal Co.	Coalville	Frank Kateo	26	American	Miner	Injured		Married		One	Fall of coal; knee slightly bruised.
Carbon	Nov. 3, 1911	Northwestern Improvement Co.	Red Lodge	John Trenastic	33	Austrian	Miner	Injured		Married		Three	Falling roof; leg broken at ankle.
Carbon	Nov. 10, 1911	Bituminous Coal Co.	Coalville	J. P. Mooney	40	American	Engineer	Injured		Married		Four	Machinery (surface); three fingers crushed.
Carbon	Nov. 20, 1911	Smokeless and Sootless Coal Co.	Bear Creek	John Pfrognar	29	Bohemian	Machine operator.		Killed		Single		Runaway trip; killed.
Carbon	Nov. 21, 1911	Northwestern Improvement Co.	Red Lodge	Tahani Poykka	42	Finlander	Miner		Killed		Single		Falling roof; killed.
Carbon	Nov. 28, 1911	Northwestern Improvement Co.	Red Lodge	Carl Silver	..		Miner	Injured					Falling roof; write for extent.
Carbon	Dec. 19, 1911	Bear Creek Coal Co.	Bear Creek	C. M. Hamilton	31	American	Nipper	Injured			Single		Moving cars (motor); hips squeezed, back injured and bowels injured.
Carbon	Dec. 22, 1911	Bear Creek Coal Co.	Bear Creek	Wm. S. Good	30	American	Foreman	Injured		Married			Electric motor; leg broken and bruised necessitating amputation, one week after injury.
Carbon	Jan. 22, 1912	Bear Creek Coal Co.	Bear Creek	John Wintz	40	Austrian	Miner	Injured			Single		Powder blasted; went back on a shot he had tamped and lit; cut on forehead, face bruised, eyes filled with coal dust, bruise on right arm.
Carbon	Feb. 7, 1912	Anaconda Copper Mining Co.	Washoe	George Jurovich	21	Montenegrin	Miner	Injured			Single		Gas explosion; face, hands and neck slightly burned.
Carbon	Feb. 28, 1912	Northwestern Improvement Co.	Red Lodge	C. Marchiando	35	Italian	Miner	Injured					Rebound of pick he was using; loss of eye.
Carbon	Jan. 24, 1912	Smokeless and Sootless Coal Co.	Bear Creek	Mike Rubezik	28	Montenegrin	Machine runner	Injured			Single		Ankle broken; mining machine slid on foot, breaking bone.
Carbon	Mar. 12, 1912	Northwestern Improvement Co.	Red Lodge	William Ramsay	26	Eng.-Can'd'n	Motorman	Injured			Single		Compound fracture of left arm between elbow and wrist; arm caught in door frame and motor.
Carbon	Mar. 16, 1912	Anaconda Copper Mining Co.	Washoe	William Douglass	25	American	Driver	Injured			Single		Hips bruised and squeezed; caught between rib and moving car.
Carbon	Mar. 16, 1912	Northwestern Improvement Co.	Red Lodge	Joseph Romerso	33	Italian	Motorman Nipper.	Injured		Married		Two	Leg broken; moving trip, was knocked off timber trucks he was riding.
Carbon	Mar 20, 1912	Northwestern Improvement Co.	Red Lodge	Evert Hill	27	Finlander	Miner	Injured			Single		Leg broken above and at knee; falling roof.
Carbon	Mar. 25, 1912	I. C. Coal Co.	Bear Creek	John Lapsansky	21	Slavonian	Machine operator.	Injured			Single		Left foot injured, bruises behind foot and fracture of 3rd meta torsal. Machine dropped on him while skidding it off trucks.
Carbon	Mar. 26, 1912	Smokeless and Sootless Coal Co.	Bear Creek	Ben. Rosetti	..	Italian	Loader	Injured			Single		Broken leg; falling roof.
Carbon	May 22, 1912	Bear Creek Coal Co.	Bear Creek	Louis Merhar	21	Austrian	Nipper, extra man	Injured			Single		Runaway motor trip; cut in forehead through skin muscle about one-half inch long above nose, scratch across bridge of nose, multiple scratch on chin; sprained wrist left; slight injury to left knee.
Carbon	May 23, 1912	Bear Creek Coal Co.	Bear Creek	Frank Pirz	55	Austrian	Machine helper	Injured		Married		Four	Electric undercutting machine; skin fascia ligaments tendons on anterior and outer side left foot were torn, exposing the ankle joint, another cut into metatarsals was about one-half inche deep, another cut in calf of leg about four inches long through skin fascia and tearing through muscle of the calf.

Accidents From October 31, 1911, to October 31, 1912 (1912 Period)—Continued

County.	Date.	Name of Company.	Locality.	Name of Person Injured.	Age	Nationality.	Occupation.	Injured	Killed	Married	Single	No. of Children.	Cause of accident; extent of injury.
Carbon	May 24, 1912....	Northwestern Improvement Co.	Red Lodge	Alfred K. Aho.	29	Finlander	Miner	Injured		Married		One	Falling roof coal; right leg broken in two places below the knee. (Foot amputated).
Carbon	May 27, 1912....	Bear Creek Coal Co.	Bear Creek	Barney Nepoti	32	Italian	Miner	Injured			Single		Blasted with powder charged hole. Fracture of ulna and radius (compound) about 4 inches from elbow (left), a fracture of oleranen (compound) right, numerous cuts on hands, numerous scalp wounds, some requiring stitches, bleeding from both ears, bruised foot.
Carbon	May 27, 1912....	Bear Creek Coal Co.	Bear Creek	Joe Grizzio	29	Italian	Miner	Injured			single		Same accident; slight injury to head and hand.
Carbon	June 1, 1912....	Northwestern Improvement Co.	Red Lodge	Dan. Miller	25	Austrian	Miner	Injured			Single		Falling coal; broken leg
Carbon	June 1, 1912....	Northwestern Improvement Co.	Red Lodge	John Albert Sanderson	17	American	Car coupler	Injured			Single		Elevator in machine shops; (Extent not given, write Carbon County Hospital).
Carbon	June 4, 1912....	Bear Creek Coal Co.	Bear Creek	Adam Wakenshaw	40	Englishman	Miner	Injured		Married		One	Rolling timber; leg broken.
Carbon	June 19, 1912....	Northwestern Improvement Co.	Red Lodge	Dominick Varisco	29	Italian	Miner		Killed.		Single		Falling roof; killed.
Carbon	July 12, 1912....	Northwestern Improvement Co.	Red Lodge	Dominick Leone	25	Italian	Miner	Injured			Single		Falling roof; right leg broken in two places, above knee.
Carbon	July 8, 1912....	Northwestern Improvement Co.	Red Lodge	Mike Koluger	37	Montenegrin	Miner	Injured			Single		Falling roof; head cut, back cut and bruised, leg hurt.
Carbon	July 29, 1912....	Northwestern Improvement Co.	Red Lodge	Charles Ardisonne	25	Italian	Miner	Injured		Married			Falling coal; broken leg. (Extent not given).
Carbon	July 26, 1912....	Northwestern Improvement Co.	Red Lodge	Wm. Bates	28	American	Miner	Injured					Falling roof; sprained and probably.
Carbon	July 30, 1912....	Bear Creek Coal Co.	Bear Creek	John Lodge	25	Englishman	Nipper	Injured			Single		Moving cars; hips broken and body bruised.
Carbon	Sept. 7, 1912....	Northwestern Improvement Co.	Red Lodge	Herman Hahto	30	Finlander	Miner		Killed.	Married		One	Falling coal; sluffing off rib in working place; killed.
Carbon	Aug. 5, 1912....	I. C. Coal Co.	Bear Creek	Charles Miller	21	American	Driver	Injured			Single		Moving cars; arm broken.
Carbon	Aug. 26, 1912....	Anaconda Copper Mining Co.	Washoe	Thomas Davis	23	American	Driver	Injured			Single		Moving cars; muscles in left leg wrenched and bruised.
Carbon	Oct. 28, 1912....	I. C. Coal Co.	Bear Creek	Ignet Lusin	32	Austrian	Timberman's hlpr.	Injured			Single		Moving cars, surface; leg and arm and three ribs broken, lungs and liver injured.
Musselshell	Nov. 9, 1911....	Republic Coal Co.	Klein	Mike Mitchie	31	Italian	Driver	Injured		Married		One	Moving cars; crushed finger on left hand to near 1st joint.
Musselshell	Nov. 21, 1911....	Republic Coal Co.	Klein	Charles W. Thomas	29	English	Miner	Injured		Married			Falling coal; right supra arbital ridge drawn in, inner table not fractured, occupant dacerated three inches in three different directions through scalp, and left ankle dislocated and protruding through the skin internally.
Musselshell	Dec. 9, 1911....	Republic Coal Co.	Klein	Daniel McInnis	37	Scotchman	Miner	Injured		Married		Six	Falling roof; fracture of crest of illium, left; dislocation of lower dorsal vertebrae; fracture 8th rib in axillary line; laceration of skin one inch above left illiac crest, through which bleeding occurred from fractured rib.
Musselshell	Nov. 28, 1911....	Republic Coal Co.	Klein	Joseph Rumoid	29	Italian	Miner		Killed.		Single		Falling coal; killed.
Musselshell	Dec. 14, 1911....	Davis Coal Co.	Roundup	John Schrader	39	American	Miner	Injured	Killed.		Single		Blasted with powder charged hole; went back on shot, fatally injured. Died.
Musselshell	Feb. 10, 1912....	Republic Coal Co.	Klein	John E. Lacy	24	American	Gasoline Motorman.	Injured			Single		Moving cars; making flying switch with empty trips, switchman did not throw switch. Motor and empty trip ran into loaded trip on parting, leg broken, bruised hip and back, taken to Murray's Hospital, Butte.
Musselshell	Jan. 12, 1912....	Roundup Coal Mining Co.	Roundup	John Matool	50	Austrian	Miner	Injured		Married		Two	Falling roof. Write for extent of injuries.
Musselshell	May 8, 1912....	Republic Coal Co.	Klein	John Sorich	28	Austrian	Tracklayer	Injured		Married		Two	Falling roof; contusion of back (lumbar), and hips; laceration of skin perincum and compound fracture of left tibia, middle 3rd.
Musselshell	June 5, 1912....	Roundup Coal Mining Co.	Roundup	Emmerson Bailey	25	American	Motorman		Killed.		Single		Moving trip; killed, brake beam broken.
Musselshell	May 25, 1912....	Roundup Coal Mining Co.	Roundup	Arthur Griffin	25	American	Machineman	Injured			Single		Mining machine; contusion of right hip.
Musselshell	July 2, 1912....	Pine Creek Coal Co.	Roundup	Toney Bicco	27	Aus.-Hung.	Miner	Injured			Single		Falling roof; back broken.
Musselshell	Sept. 23 1912....	Republic Coal Co.	Klein	Geo. Wm. Martin	36	Scotchman	Pipe foreman	Injured		Married		Five	Moving car; fracture of right femur, middle third, and contusion of shoulder.
Park	Jan. 18, 1912....	Maxey Bros.	Chimney Rock	David Moses	21	American	Miner	Injured		Married			Falling coal; leg broken below knee.
Park	July 11, 1912....	Maxey Bros.	Chimney Rock	Joseph Pirtz	24	Austrian	Timberman	Injured		Married			Falling coal, right leg broken, both bones.

j—Fatally injured.
h—Wife, two children.
a—Small children, 2 yrs. and one 6 mos.
g—Wife, no children.
b—divorced.
f—Wife and child.
c—Two sisters and two brothers.
e—Wife and two children.
d—Wife and two children.